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NEW YORK STATE COLLEGE OF AGRICULTURE ANNOUNCEMENT 1916-17

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INDEX

CALENDAR

First Term, 1916-17

Sept. 15	Friday,	University entrance examinations begin.
Sept. 25	Monday,	Academic year begins. Registration of new students. All special students in the College of Agriculture must first present themselves at the office of the Secretary, Roberts Hall, unless permission to register has previously been sent to them by the Registrar.
Sept. 26	Tuesday,	Registration of new students.
Sept. 27	Wednesday,	Registration of old students.
Sept. 28	Thursday,	Instruction begins. President's annual address to the students.
Sept. 30	Saturday,	Registration, graduate students.
Oct. 17	Tuesday,	Last day for payment of tuition.
Nov. 8	Wednesday,	Registration of winter-course students.
Nov. 30	Thursday,	Thanksgiving recess.
Dec. 20	Wednesday,	Instruction ends in regular and winter courses. } Christmas recess.
Jan. 4	Thursday,	Instruction resumed in regular and winter courses. }
Jan. 11	Thursday,	Founder's Day.
Jan. 29	Monday,	Term examinations begin.
Feb. 12–17	(week of)	Farmers' Week.
Feb. 16	Friday,	Instruction ends in winter courses.

Second Term, 1916-17

Feb. 10	Saturday,	Registration, undergraduates.
Feb. 12	Monday,	Instruction begins.
Mar. 2	Friday,	Last day for payment of tuition.
Apr. 4	Wednesday,	Instruction ends } Spring recess.
Apr. 12	Thursday,	Instruction resumed }
May 26	Saturday,	Navy Day.
June 6	Wednesday,	Term examinations begin.
June 20	Wednesday,	Forty-ninth Annual Commencement.

Third Term, 1916-17

June 11	Monday,	Registration.
June 12	Tuesday,	Instruction begins.
Sept. 26	Wednesday,	Term ends.

Summer School in Agriculture, 1917

July 9	Monday,	Summer School begins.
Aug. 17	Friday,	Summer School ends.

First Term, 1917-18

Sept. 14	Friday,	Entrance examinations begin.
Sept. 24	Monday,	Registration of new students.
Sept. 25	Tuesday,	Registration of new students.
Sept. 26	Wednesday,	Registration of old students.
Sept. 27	Thursday,	Instruction begins.

NEW YORK STATE COLLEGE OF AGRICULTURE

FACULTY

Jacob Gould Schurman, A.M., D.Sc., LL.D., President of the University.
Beverly Thomas Galloway, B.Agr.Sc., LL.D., Dean of the College of Agriculture and Director of the Experiment Station.
Isaac Phillips Roberts, M.Agr., Professor of Agriculture, Emeritus.
John Henry Comstock, B.S., Professor of Entomology and General Invertebrate Zoology, Emeritus.
Henry Hiram Wing, M.S. in Agr., Professor of Animal Husbandry.
Thomas Lyttleton Lyon, Ph.D., Professor of Soil Technology.
John Lemuel Stone, B.Agr., Professor of Farm Practice.
James Edward Rice, B.S.A., Professor of Poultry Husbandry.
George Walter Cavanaugh, B.S., Professor of Chemistry in its Relations to Agriculture.
George Nieman Lauman, B.S.A., Professor of Rural Economy.
Herbert Hice Whetzel, A.M., Professor of Plant Pathology.
Elmer O. Fippin, B.S.A., Extension Professor of Soil Technology.
George Frederick Warren, Ph.D., Professor of Farm Management.
William Alonzo Stocking, jr., M.S.A., Professor of Dairy Industry.
Charles Henry Tuck, A.B., Professor of Extension Teaching.
Albert Russell Mann, B.S.A., A.M., Professor of Rural Social Organization.
Wilford Murry Wilson, M.D., Professor of Meteorology.
Ralph Sheldon Hosmer, B.S.A., M.F., Professor of Forestry.
James George Needham, Ph.D., Professor of Entomology and Limnology.
Rollins Adams Emerson, D.Sc., Professor of Plant Breeding.
Harry Houser Love, Ph.D., Professor of Plant Breeding Investigations.
Arthur Witter Gilbert, Ph.D., Professor of Plant Breeding.
Donald Reddick, Ph.D., Professor of Plant Pathology.
Edward Gerrard Montgomery, M.A., Professor of Farm Crops.
George Alan Works, B.Ph., M.S. in Agr., Professor of Rural Education.
Flora Rose, B.S., M.A., Professor of Home Economics.
Martha Van Rensselaer, A.B., Professor of Home Economics.
William Albert Riley, Ph.D., Professor of Insect Morphology and Parasitology.
James Adrian Bizzell, Ph.D., Professor of Soil Technology.
Glenn Washington Herrick, B.S.A., Professor of Economic Entomology and Entomologist of the Experiment Station.
Howard Wait Riley, M.E., Professor of Rural Engineering.
Harold Ellis Ross, M.S.A., Professor of Dairy Industry.
Hugh Charles Troy, B.S.A., Professor of Dairy Industry.
Samuel Newton Spring, B.A., M.F., Professor of Forestry.
Karl McKay Wiegand, Ph.D., Professor of Botany.
William Henry Chandler, M.S. in Agr., Ph.D., Professor of Pomology.
Arthur Bernhard Recknagel, B.A., M.F., Professor of Forestry.
Merritt Wesley Harper, M.S., Professor of Animal Husbandry.
Cyrus Richard Crosby, A.B., Extension Professor of Entomology.
Elmer Seth Savage, M.S.A., Ph.D., Professor of Animal Husbandry.
Kenneth Carter Livermore, M.S. in Agr., Professor of Farm Management.
Edward Albert White, B.Sc., Professor of Floriculture.
Alvin Casey Beal, Ph.D., Professor of Floriculture.
Herbert Andrew Hopper, B.S.A., M.S., Extension Professor of Animal Husbandry.
Edward Sewall Guthrie, M.S. in Agr., Ph.D., Professor of Dairy Industry.
Maurice Chase Burritt, M.S. in Agr., Extension Professor and State Director of Farm Bureaus.
William Charles Baker, B.S.A., Professor of Drawing.
Mortier Franklin Barrus, Ph.D., Extension Professor of Plant Pathology.

Lewis Josephus Cross, B.A., Ph.D., Professor of Chemistry in its Relations to Agriculture.
Oskar Augustus Johannsen, A.M., Ph.D., Professor of General Biology.
Clyde Hadley Myers, Ph.D., Professor of Plant Breeding.
Bristow Adams, B.A., Professor of Extension, Information Service.
Dick J. Crosby, M.S., Professor of Extension Teaching.
Asa Carlton King, B.S.A., Professor of Farm Practice.
Cornelius Betten, Ph.D., Professor, Secretary, and Registrar.
George Abram Everett, A.B., LL.B., Professor of Extension Teaching.
Frederick Llewellyn Griffin, B.S., M.S., Professor of Rural Education.
Lewis Knudson, B.S.A., Ph.D., Assistant Professor of Botany.
E. Gorton Davis, B.S., Professor of Landscape Art.
Ralph Wright Curtis, M.S.A., Professor of Landscape Art.
Claude Burton Hutchison, M.S. in Agr., Professor of Plant Breeding.
Ralph W. Rees, B.S., Professor of Pomology.
James Chester Bradley, Ph.D., Assistant Professor of Systematic Entomology.
John Bentley, jr., B.S., M.F., Assistant Professor of Forestry.
George Charles Embody, Ph.D., Assistant Professor of Aquiculture.
Harry Oliver Buckman, M.S.A., Ph.D., Assistant Professor of Soil Technology.
Mrs. Helen Binkerd Young, B.Arch., Assistant Professor of Home Economics.
Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature Study.
Ralph Hicks Wheeler, B.S., Assistant Professor of Extension Teaching.
Harry Morton Fitzpatrick, Ph.D., Assistant Professor of Plant Pathology.
Byron Burnett Robb, B.S. in Agr., M.S. in Agr., Assistant Professor of Rural Engineering.
Walter Warner Fisk, M.S. in Agr., Assistant Professor of Dairy Industry.
Vern Bonham Stewart, Ph.D., Assistant Professor of Plant Pathology.
Annette J. Warner, Assistant Professor of Home Economics.
Arthur Lee Thompson, Ph.D., Assistant Professor of Farm Management.
Royal Gilkey, B.S.A., Assistant Professor of Extension Teaching, and Supervisor of Reading Course for the Farm.
Charles Truman Gregory, Ph.D., Assistant Professor of Plant Pathology.
Lex Ray Hesler, Ph.D., Assistant Professor of Plant Pathology.
William Howard Rankin, Ph.D., Assistant Professor of Plant Pathology.
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Arthur Johnson Eames, Ph.D., Assistant Professor of Botany.
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Blanche Evans Hazard, A.B., M.A., Assistant Professor of Home Economics.
David Lumsden, Assistant Professor of Floriculture.
John Hall Barron, B.S.A., Assistant Extension Professor of Farm Crops.
Gad Parker Scoville, B.S. in Agr., Assistant Professor of Farm Management.
Arthur Augustus Allen, Ph.D., Assistant Professor of Ornithology.
Leonard Amby Maynard, A.B., Ph.D., Assistant Professor of Animal Husbandry.
Forest Milo Blodgett, Ph.D., Assistant Professor of Plant Pathology.
Miriam Birdseye, B.A., Assistant Professor of Home Economics.
Jacob R. Schramm, Ph.D., Assistant Professor of Botany.
Howard Edward Babcock, Ph.B., Assistant Professor and Assistant State Director of Farm Bureaus.
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Frank Elmore Rice, A.B., Ph.D., Assistant Professor of Agricultural Chemistry.
Lester Whyland Sharp, B.S., Ph.D., Assistant Professor of Botany.
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Charles Howard Royce, M.S.A., Assistant Extension Professor of Animal Husbandry.

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Charles Harvey Hadley, jr., B.S., Investigator in Entomology.
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Eugene Davis Montillon, B.Arch., Instructor in Landscape Art.
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Anna Clegg Stryke, A.B., Instructor in Entomology.
Leslie Eugene Hazen, B.S. in Agr., Instructor in Farm Structures.
James Lewis Strahan, B.S. in Agr., M.S. in Agr., Instructor in Farm Structures.
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Cass Ward Whitney, B.S., Instructor in Extension Teaching.
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Charles Paul Alexander, B.S., Instructor in Natural History.
Charles Chupp, A.B., Instructor in Plant Pathology.
Laurence Howland MacDaniels, A.B., Instructor in Botany.
Allan Cameron Fraser, B.S., Instructor in Plant Breeding.
Lua Alice Minns, B.S., Instructor in Floriculture.
George Cornell Supplee, M.S.A., Instructor in Dairy Industry.
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Arthur Merle Besemer, B.S., Instructor in Dairy Industry.
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Thomas Alexander Baker, B.S., Instructor in Animal Husbandry.
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Leon Augustus Hausman, B.A., Instructor in Meteorology.
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Clark Leonard Thayer, B.Sc., Instructor in Floriculture.
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Lewis Merwin Hurd, Extension Instructor in Poultry Husbandry.

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Cedric Hay Guise, B.S., M.F., Instructor in Forestry.
Emil Volz, B.Sc., Instructor in Floriculture.
Walter Sprague Frost, B.S., Instructor in Soil Technology.
Gilbert Warren Peck, B.S., Extension Instructor in Pomology.
Frances Vinton, B.A., Instructor in Home Economics.
Albert Reiff Bechtel, A.M., Instructor in Botany.
James Marshall Brannon, B.A., M A., Instructor in Botany.
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Clara Louise Garrett, B.S., Instructor in Drawing.
Clarence Vernon Noble, B.S., Instructor in Farm Management.
Sarah Lucile Brewer, B.S., Instructor in Home Economics.
Charles Parsons Clark, B.S., Instructor in Farm Management.
A. Wright Gibson, Instructor in Farm Practice.
Ada Eljiva Georgia, Assistant in Natural History
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Ralph Irving Scoville, B.S., Assistant in Dairy Industry.
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Claribel Nye, B.S., Assistant in Home Economics.
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Howard Campbell Jackson, B.S., Assistant in Dairy Industry.
Miles B. Haman, B.S., Assistant in Forestry.
Louis Arthur Zimm, B.S., Assistant in Plant Pathology.
George Robinson Phipps, B.S., Assistant in Extension Teaching.
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Max Flavel Abell, B.S., Assistant in Farm Crops.
John B. Wentz, B.S., Assistant in Farm Crops.

Ernest Gustaf Anderson, B.Sc., Assistant in Plant Breeding.
Ernest Walter Lindstrom, A.B., Assistant in Plant Breeding.
Gustave Frederick Heuser, B.S., Assistant in Poultry Husbandry.
Wallace Shipman Young, B.S., Assistant in Poultry Husbandry.
Clarence H. Kennedy, A.B., M.A., Assistant in Biology.
Roland H. Hill, Assistant in Agricultural Chemistry.
Charles Loring Allen, B.A., Assistant in Animal Husbandry.
Thomas Bragger, B.S., Assistant in Plant Breeding.
Stanley Cortland Garman, Assistant in Forestry.
Edwin Ingersoll Kilbourne, Assistant in Forestry.
Royal Gould Bird, B.S., Assistant in Forestry.
Harold Eugene Botsford, Assistant in Poultry Husbandry.
Doak Bain Carrick, M.S., Assistant in Pomology.
Henry Working, Assistant in Rural Economy.
John Phineus Benson, B.S., Assistant in Botany.
Philip A. Munz, A.B., A.M., Assistant in Botany.
Walter C. Muenscher, A.B., M.A., Assistant in Botany.
Chester C. Demaree, A.B., Assistant in Botany.
Edwina M. Smiley, B.S., Assistant in Plant Pathology.
Erford Lynn Banner, B.S., Assistant in Poultry Husbandry.
John Hallock Bromley, B.S., Assistant in Soil Technology.
Lawrence Glen Brown, B.S., Assistant in Entomology.
E. H. Dusham, Assistant in Biology.
C. C. Hamilton, Assistant in Natural History.
Ray Allen, Assistant in Ornithology.
Ralph Hubbard, Assistant in Natural History.
George Hirst Bradley, B.S., Assistant in Biology.
William Prindle Alexander, Assistant in Natural History.
William J. Baerg, Assistant in Biology.
Edith Fleming Bradford, B.S., Assistant in Home Economics.
V. R. Haber, Assistant in Entomology.
George C. Stewart, Assistant in Farm Crops.
Frederic Day Brooks, B.S., Assistant in Poultry Husbandry.
Homer Jay Brooks, B.S., Assistant in Dairy Industry.
Leon Emory Cook, A.B., B.S. in Agr., Assistant in Rural Education.
Cyrus Falconer, A.B., Assistant in Extension Teaching.

THE NEW YORK STATE COLLEGE OF AGRICULTURE

Cornell University is composed of eight colleges and the Graduate School. One of these colleges is the College of Agriculture.

Cornell University was chartered by the Legislature in 1865, being founded on the Land-Grant Act of 1862. By the terms of the Land-Grant Act, teaching in agriculture has been from the first a regular part of the university enterprise. In other states, the state government has made appropriations to supplement the work in agriculture. In 1904 the Legislature of the State of New York made an appropriation of $250,000 for the erection of buildings for the College of Agriculture in Cornell University and established the College as a state institution under the title "The New York State College of Agriculture at Cornell University." Before this time the State had established at Cornell University "The New York State Veterinary College." In 1906 the Legislature passed an Administration Act defining the purpose and activities of the College of Agriculture thus: "The object of the said college of agriculture shall be to improve the agricultural methods of the state; to develop the agricultural resources of the state in the production of crops of all kinds, in the rearing and breeding of livestock, in the manufacture of dairy and other products, in determining better methods of handling and marketing such products, and in other ways; and to increase intelligence and elevate the standards of living in the rural districts. For the attainment of these objects the college is authorized to give instruction in the sciences, arts, and practices relating thereto, in such courses and in such manner as shall best serve the interests of the state; to conduct extension work in disseminating agricultural knowledge throughout the state by means of experiments and demonstrations on farms and gardens, investigations of the economic and social status of agriculture, lectures, publications of bulletins and reports, and in such other ways as may be deemed advisable in the furtherance of the aforesaid objects; to make researches in the physical, chemical, biological, and other problems of agriculture, the application of such investigations to the agriculture of New York, and the publication of the results thereof."

THE BUILDINGS AND FARMS

The buildings. The buildings erected under the enactment of 1904 were first occupied in June, 1907. The central group then erected consisted of a main administration and classroom building, an agronomy building, and a dairy building, the three being connected by covered loggias. Subsequently the Legislature provided for the erection of two large barns, a greenhouse, a home economics building, a forestry building, a poultry husbandry building, a soils building, an auditorium, and a classroom building and stock judging pavilion for animal husbandry. An extension to the greenhouse range, several small poultry buildings, a sheep barn, a farm shop and tool shed, and an addition to the cafeteria in the Home Economics Building have been completed, and a heating plant has been installed.

Other buildings included in the present equipment are a frame building that temporarily houses the Department of Rural Engineering, an insectary, a biologi-

cal station in the marsh at the south end of Cayuga Lake, a fish breeding house in Cascadilla Creek, a seed storage house, and other small buildings on the farms.

The farms. The College of Agriculture has 909 acres of land, and it rents 195 acres additional, making a total of 1104 acres under college management. These farms are run not for commercial but for educational purposes, and the practices are therefore modified to meet the varied demands of the institution.

Land in the vicinity of the College is very broken, abounding in hills and dales, brooks and gorges. In consequence, less than one-half of the total area is now available for tillage. Of the 1104 acres, 567 are classified as arable, 304 as pasture, and 143 as wood and waste, 51 are devoted to college grounds, buildings, and old orchards, and 39 are retained for other uses.

Of the tillable area, 45 acres have been laid out in permanent experiment plots for the use of the Departments of Soil Technology and Plant Breeding; 50 acres have been assigned to the Department of Pomology and are largely planted to young trees; 45 acres have been assigned to the Departments of Floriculture and Vegetable Gardening; 73 acres to the Department of Poultry Husbandry; 15 acres to farm-crop gardens and experiments; and there are left to the Department of Farm Practice 339 acres on which to conduct the regular farm operations.

The soil of the college farms is heavy, nearly all of it being Dunkirk clay loam. A few fields at the extreme southeastern corner are Volusia stony loam. The Dunkirk clay loam is entirely unsuited to potatoes and is not well adapted to corn, but will grow fair crops of corn if heavily manured. It is well adapted to wheat, oats, timothy, and clover. The Volusia stony loam, when well drained and freed from stones, is well adapted to corn and potatoes. The recently acquired areas lack both these improvements.

THE COLLEGE LIBRARIES

The library facilities of the College of Agriculture include: a large collection of books and periodicals on agriculture, horticulture, forestry, entomology, and other kindred subjects, contained in the University Library and numbering about 15,000 volumes; the Agricultural College Library in the basement of the Agronomy Building, with a working and a reference collection of approximately 5000 bound volumes and a large number of bulletins, reports, and other pamphlets in unbound form; the Entomological Library (Roberts Hall, Room 403, fourth floor), one of the largest and best working libraries in general entomology in the United States; and various small departmental collections for laboratory and office use. In addition to these, the Agricultural College Library possesses the Craig horticultural library, gift of the widow of the late Professor John Craig, consisting of about 3000 volumes and considered to be one of the best private collections in the United States. The Department of Animal Husbandry has a large and rapidly increasing collection of herd books, registers, and the like, for the use of its instructing staff and its students. Altogether, about 30,000 volumes are available for the instructing staff and the students of the College of Agriculture—including the Craig library and the duplicates carried by the various laboratories—all of which, except the Craig and laboratory collections, are regularly catalogued at the University Library and are under its general rules and supervision. The Agricultural College Library and the Entomological Library

are practically branches of the University Library and enjoy the services of its purchasing and cataloguing departments.

All these libraries are likewise provided with the principal periodicals relating to agriculture and kindred subjects. In the University Library are to be found the files and current numbers of the leading foreign periodicals, especially those of a purely scientific character and those used chiefly for research. The Agricultural Library carries on its shelves nearly three hundred periodicals of various kinds for the use of students; these include the principal agricultural, horticultural, and stock-raising journals of the United States and Canada, together with many from foreign countries. The Entomological Library is supplied with the leading periodicals relating to general and economic entomology. In addition to these, many of the departments receive periodicals for the use of instructors and students, and the Departments of Dairy Industry, Home Economics, and Poultry Husbandry maintain small reading rooms of their own.

All the books of the Agricultural College Library are in reserve for reference purposes only; students are allowed to draw them for home use only when the library is closed over night and over Sunday. In order to afford the greatest possible opportunity for using the books, the Agricultural College Library is open from a quarter past eight in the morning until ten o'clock at night every day of the week during the college year except Saturdays, when it is closed at one o'clock in the afternoon.

FACILITIES AND EQUIPMENT OF THE DEPARTMENTS

Agricultural Chemistry

The chemical laboratory in which instruction in agricultural chemistry was given was destroyed by fire on February 13, 1916. Ample facilities are temporarily provided in other buildings in the University.

Animal Husbandry

The equipment in animal husbandry available for purposes of instruction is as follows:

1. **The college herds and flocks.** A herd of about one hundred and twenty-five head of cattle is maintained. Aside from a carload of steers fed for market each year, it is essentially a dairy herd, to a large extent bred and developed by the College itself. At present it contains representative specimens of Holsteins, Jerseys, Guernseys, Ayrshires, and Shorthorns.

The College maintains an imported Percheron stallion and a pure-bred Hackney stallion. Eight pure-bred Percheron mares are used primarily for breeding purposes. The farm teams illustrate grade draft horses of several types.

A flock of about one hundred and twenty-five sheep includes representative specimens of Dorsets, Shropshires, and Rambouillets. A mixed flock is also maintained for the production of winter, or hothouse, lambs.

About ten brood sows of the Cheshire breed, "the New York Farmer's Hog," are kept to utilize waste dairy products and to illustrate a profitable early-maturing butcher's hog of a semi-bacon type.

2. **Herd books and flock books.** The library of herd books and flock books is large, comprising more than one thousand volumes and including com-

plete sets dealing with all the more important breeds and with many of the lesser ones.

A fairly complete collection of lantern slides illustrating breed types, and skeletons of the horse and the ox, add to the material available for classroom purposes.

The new headquarters building for the Department of Animal Husbandry is at the eastern end of the campus. It is approximately fifty by ninety feet in area, with an extension about fifty by fifty feet, is three stories high, with a high basement, and contains offices, laboratories, lecture rooms, and classrooms for the Department.

The large stock-judging pavilion adjacent is eighty by one hundred and eighty feet in size, with a clear span. It gives abundant opportunity not only for stock-judging purposes but also for the exhibition of horses and horsemanship.

Botany

The Department of Botany is well supplied with microscopes and other necessary laboratory equipment, while the college farm and the ravines, marshes, and forests about Ithaca are unusually rich in botanical material.

The Laboratory of Plant Physiology is well equipped for instruction and research. The laboratory facilities include microscopes, microtomes, incubators, ovens, sterilizers, and other special physiological and bacteriological apparatus; precision instruments for the measurement of environmental conditions; chemical tables, titration stands, a nitrogen still, balances, glassware, and other materials required in that part of the work dealing with biochemistry and fermentation.

The instruction is arranged with reference not merely to persons who are interested in various phases of plant industry, but also to those who may be preparing themselves as teachers or as investigators in related lines. Special opportunities are offered to those properly trained in physiology, horticulture, and agronomy, to undertake fundamental investigations in the general field of plant response and behavior.

The new greenhouses offer opportunities for class work and for individual investigation. Moreover, the university farms and grounds will supply, for those who may devote the growing season to their investigations, a variety of crops and ornamental plants needed for particular observation and experiment.

Dairy Industry

The Department of Dairy Industry occupies the building east of Roberts Hall and is connected with the latter by a loggia. The classrooms, bacteriological and testing laboratories, locker rooms, reading room, offices, and dairy mechanics rooms occupy a part of the building fifty by one hundred feet in area and three stories high. All manufacturing work is conducted in the remaining part of the building, sixty by one hundred and sixty feet in area and one story high. The manufacturing rooms are thoroughly sanitary, fully equipped, and well adapted for instruction and for commercial work. In the winter about fifteen thousand pounds of milk are handled daily, and in the summer the milk received at the Dairy Building and the cream received from six skimming stations represent about thirty thousand pounds of milk daily. The skimming stations are located at short

distances north of Ithaca and are equipped and conducted as are stations operated exclusively for commercial purposes.

A deposit is required to cover the value of apparatus lent to students. When the apparatus is returned in good order the deposit is returned, less a general breakage charge sufficient to cover losses of general equipment. Clean white suits are required for all practice work in the Department. These suits may be bought by the student, or they may be rented from the Department at fifty cents a term. Lockers for these suits, as well as for equipment used by individual students in the laboratories, are provided without charge.

Drawing

The drafting rooms and office of the Department of Drawing occupy the third floor of the Dairy Building. Skylights in the roof furnish abundant light, and the quarters are very satisfactory for the study of drawing.

There are two drafting rooms. The one for mechanical drawing is equipped with thirty specially designed desks, each holding the materials of two students, thus providing accommodations for a total of sixty students. For instruction in this subject there is a small collection of simple machine parts, wooden models, and demonstration apparatus. The free-hand drawing room is equipped with thirty-five Cleaves drawing desks. For study there are provided a number of casts, copies of classic sculpture, artificial plant forms, and a collection of insects, shells, skulls, and stuffed birds and animals, together with a series of reproductions, in color and in black and white, of good examples of graphic art; the aim being to develop the student's appreciation of good art as well as to teach him how to draw.

Entomology

The Department of Entomology, Limnology, and Nature Study occupies the third and fourth floors of Roberts Hall. The laboratories are well equipped for all phases of entomological study. There is a good supply of microscopes and accessories, including equipment for photomicrographic work. In addition there is a very full outfit for insect photography. Ample facilities, such as microtomes, paraffin ovens, and reagents, are provided for work in insect morphology and embryology, and an extensive collection of prepared slides is at the disposal of students.

The insect collections, developed as an adjunct to the work of instruction, are especially rich in biological and illustrative material. In addition to many exotic species they contain specimens of a large number of the more common species of the United States. These have been determined by specialists and are accessible for comparison.

The lecture room is provided with a synoptic collection of insects, sets of the Leuckart and the Pfurtscheller diagrams, models, projection lanterns, and complete means for the projection of microscopic objects.

Adjacent to the laboratories is an insectary, which, together with the insectary of the Agricultural Experiment Station, affords to advanced students exceptional opportunities for special investigation in life histories, and for experiments in applied entomology.

For study of the life histories, biology, and economic importance of aquatic forms, unrivalled facilities are afforded by the field laboratory, located in the

midst of the Renwick marshes and provided with breeding cages, running water, and aquaria; and by a hatching station on the university grounds in the gorge of Cascadilla Creek.

Extension

The Department of Extension Teaching is located on the first floor of Roberts Hall. Its classes are held in a room on the first floor of this building and a room on the second floor of the Dairy Building. The offices of the Cornell Reading Course for the Farm are in the basement of Roberts Hall.

Farm Bureaus

The Department of Farm Bureaus is located on the second floor of Roberts Hall. This Department represents the New York State Department of Agriculture, the Division of Farmers' Cooperative Demonstrations, North and West, in the United States Department of Agriculture, and the College of Agriculture, in the administration and supervision of the farm bureau work in New York State. It has general charge of the organization of new farm bureaus and of the cooperative relations of the institutions represented with the bureaus, and receives weekly work reports and monthly financial reports from the managers in the different counties. Its equipment consists mainly in files and records of farm bureaus.

Farm Crops

Instruction in farm crops is given by means of lectures, recitations, and field and indoor laboratory work. The Department is provided with a lecture room and a large, well-lighted laboratory. Farm-crop materials are procured for use in indoor laboratory work. Bulletins of the various experiment stations constitute a part of the laboratory equipment. The farms and experimental plots are used for laboratory work in the field.

Farm Management

In the Farm Management Building are two laboratories, and rooms for research work.

Floriculture

The equipment of the Department of Floriculture is divided into two parts: that belonging to the classrooms, laboratories, and administrative rooms, and that connected with the forcing houses and gardens, and with the experimental areas in the field.

1. **Classrooms and laboratories.** Lectures are given on the second floor of the Floriculture Building. The lecture room is provided with a stereopticon, and has a seating capacity of seventy-five persons. On this floor are also the offices of the instructors and a reading room containing floricultural publications.

The first floor includes a large laboratory, a seed room, and the gardener's office. The basement area is used for the storage of pots, flats, and other greenhouse material.

The administrative rooms, on the second floor of Roberts Hall, consist of four offices and a filing room. Large display cases in the corridor are filled with floricultural implements and appliances.

2. **Forcing houses and gardens.** The greenhouses completed in 1915, cover an area of about fourteen thousand square feet. This range consists of a house for ferns, palms, and other ornamental plants, a propagating house, and houses for the culture of roses, carnations, chrysanthemums, sweet peas, and other greenhouse plants. The equipment is used by all the classes in floriculture and affords space for advanced and graduate students investigating special problems.

The Department has been assigned twenty acres of land for its large collection of peonies, irises, perennial phlox, roses, sweet peas, gladioli, and miscellaneous annual and perennial flowers. These collections afford valuable material for study and offer numerous problems for investigation.

Aside from ordinary equipment, the garden herbarium, with more than twelve thousand sheets, is an important aid in the study of plant variation. There is also a good collection of negatives showing the growth of flowers, which is being added to continually and which furnishes a bountiful source for lantern slides illustrating recent methods in the management and construction of forcing houses and the growing of flowers in the field and under glass. The Department has a collection of five hundred lantern slides, to which additions are constantly being made.

Forestry

The Department of Forestry occupies two and one-half floors in the Forestry Building, which was recently built and equipped by the State at a cost of $120,000. The building is one hundred and forty-two feet long by fifty-four feet wide, and four stories in height. One floor and one-half of another floor are being occupied temporarily by the Department of Plant Breeding, but the entire building is planned for the Department of Forestry and is to be used exclusively by that Department as soon as a Plant Industry Building is provided. The building affords ample room and equipment for undergraduate instruction and for advanced study.

The Department has a tract of about one hundred and seventy-five acres of open land which is being used for forest planting; another tract of thirty-eight acres, partly open land and partly wooded; and eight woodlots, including stands of white pine, hardwoods, and hemlock. All these lands are within three miles of the university campus. The Department has planted more than seventy acres of its land with experimental and demonstrational plantations. There is also a forest nursery.

A forestry library of over fourteen hundred bound volumes, including extensive files of forestry periodicals, is included in the University Library. There is an excellent collection of forestry instruments.

Home Economics

The Department of Home Economics moved into its new and well-equipped building in February, 1913. In the basement of the building is a cafeteria, with kitchens and laundry. On the first floor are offices, classrooms, and an apartment in which students in turn have practice in family housekeeping. On the second floor is the assembly room, in which are held the large classes of the Department, public lectures, and social functions of the College and of the Department. Opposite the assembly room are a large family kitchen and a dining room for serving. At both ends of the hall are thoroughly equipped food labora-

tories for teaching the principles of food preparation and nutrition. The third floor is devoted to sewing laboratories. At the east end of the hall on this floor are a chemistry laboratory, not yet equipped, and offices which have been given over to the temporary use of the Department of Rural Economy. On the fourth floor are taught house planning and house furnishing, for which there is provided a large drafting room, well lighted by means of a skylight. In front of the drafting room is a loggia. At the west end of this floor is the household-management laboratory; at the east end, the recreation room for students.

The Home Economics Lodge, west of the Home Economics Building, is a small house which has been reconstructed and redecorated, in which students of the Department, together with an instructor, keep house. The principles of food preparation, household management, and house furnishing are taught here in a practical way.

The Department has a good equipment of reference books, lantern slides, illustrative material, and labor-saving devices.

Landscape Art

The Department of Landscape Art occupies its own building, a frame structure recently remodeled and enlarged for its use. On the first floor are the departmental offices, and a lecture room equipped with stereopticon lantern and having a seating capacity of seventy persons. The second floor is devoted to a single large drafting room, approximately twenty-five by sixty feet in size. In addition to providing accommodation for about thirty-five students in design and other drafting courses, this room has a section devoted to the work of making plans for the college campus. In the basement—which is well lighted, owing to its hillside location—are the departmental library, and a large exhibition room used for the hanging and judging of student problems in design and other courses, and for the occasional placing of special exhibitions.

The equipment of the Department, in addition to providing the usual and needed materials and facilities for teaching, includes a constantly increasing collection of lantern slides, which now numbers about four thousand. An herbarium, included as a part of the library, is also being increased in its number of specimens.

Meteorology

The Department of Meteorology is located on the fourth floor of Roberts Hall, and is maintained in cooperation with the United States Weather Bureau. This arrangement affords an unusual opportunity for students to acquaint themselves with the practical application of the science of meteorology to weather forecasting and to the study of local and general climatology in its relations with agriculture. The observatory is equipped with a full set of meteorological instruments, from which continuous observations are made. Reports are received by telegraph from about seventy-five weather stations in the United States, from which a daily weather map is made and forecasts are prepared. The departmental library, which, in addition to general works on meteorology, contains many publications bearing on the climate of various parts of the United States and of many foreign countries, is open to students.

Plant Breeding

The Department of Plant Breeding has its offices, classrooms, and undergraduate and research laboratories on the second floor of the Forestry Building, and a graduate laboratory and seminary room on the third floor. The departmental laboratories are equipped with the necessary appliances for both undergraduate instruction and graduate research, including calculating machines, microscopes, microtomes, paraffin ovens, balances, seed germinators, cameras and photographic accessories, and the like. An herbarium of variations is being built up. The departmental library contains the principal books and periodicals dealing with plant breeding and general genetics. Graduate students have the use of a part of the greenhouse space belonging to the Department. The plant breeding garden affords room for most of the cultures grown by graduate students and for the plant material used in the undergraduate courses.

Plant Pathology

The Department of Plant Pathology is located in the basement of Bailey Hall. There are two elementary laboratories—each providing facilities for twenty-four students—a large laboratory for advanced and research students, offices for the staff, and an ample stock room filled with necessary apparatus. The equipment of the laboratories and the offices consists of furniture especially built for the purpose, a complete set of microscopes and accessories, cameras, a photomicrographic outfit, microtomes, incubators, sterilizers, ovens, reagents, and so forth, for teaching and investigation. An extensive collection of prepared slides and of photographs is available to students. There is also a growing collection and museum of pathological specimens, and a departmental library rich in classic works, monographic treatises, and phytopathological periodicals. Land and greenhouses are available for experimental work as well as for teaching. The Department is now in position to offer facilities for practically every line of work within its field.

Pomology

The classrooms and laboratories of the Department of Pomology are located on the second floor of Roberts Hall. There is also a fifty-acre field laboratory devoted to commercial and varietal orchards of the different fruits. On the grounds are orchards of nearly all Temperate Zone fruits, each orchard including a rather large collection of varieties. There are also collections of various nut trees that may be grown in New York State, including English walnuts. The Department is also starting a nursery which will include not only all the different species that are likely to be grown in this section, but also dwarf trees and various stocks used for dwarfing.

Two old orchards operated by the Department furnish fruit for variety studies and packing. Each year a large assortment of fruit from various parts of this state and other states which is used for purposes of instruction, is brought together at the College. The Department is supplied with all necessary packing tables and other orchard equipment and tools.

Poultry Husbandry

The Department of Poultry Husbandry is located in the new Poultry Building, east of the greenhouses. Approximately one mile distant is the poultry farm, a

tract of some eighty acres. Houses have been erected north of the new Poultry Building, in order to provide room for instruction in exhibiting, feeding, rearing, and fattening poultry.

The new Poultry Building is one hundred and thirty-two feet by forty-eight feet in area, and consists of three stories and a basement. It contains a killing room, an egg-grading, -testing, and -marketing-room, cold-storage facilities for commercial and experimental purposes, a lecture room seating two hundred and fifty persons, three laboratories for instruction and research, two recitation rooms, a seminary room, a photographic room, a library, and lockers for three hundred students. At the poultry plant and the poultry farm are houses for about one hundred flocks, providing room for about twenty-five hundred fowls, ducks, and geese. These houses include a pipe-system brooder house, thirty-four New York State gasoline-heated colony brooder houses, and summer houses for rearing five thousand or more chickens annually.

Rural Economy

The Department of Rural Economy is located on the third floor, east end, of the Home Economics Building. The equipment includes a large room for elementary work, a smaller room for advanced work, much statistical and historical data, original as well as printed, and a series of representative calculating machines.

Rural Engineering

This Department is housed in the Rural Engineering Building, a temporary one-story structure forty by ninety-six feet in area, which provides laboratory space for the work in farm mechanics, stock room, and offices. Drafting room space for the work in farm structures and the indoor work in farm engineering is provided in Caldwell Hall.

Equipment for the work in farm mechanics includes gasoline and kerosene engines, steam machinery, an electric-light plant, pumps, hydraulic rams, water-supply systems, plows, mowers, grain binders, separate binder attachments, and other implements and tools; together with a recording traction dynamometer for draft tests, and the sprayograph, a machine devised by the Department for testing spray nozzles. For the work in farm engineering the equipment includes twelve farm levels for elementary class work, and five levels and transits of precision for the use of advanced students and members of the staff in extension work in irrigation, drainage, and sanitary engineering throughout the State. Equipment for class work in farm structures includes three models of plank frame barns, to which there will soon be added a set of models illustrating the classification and development of barn frame trusses.

Soil Technology

The Department of Soil Technology is housed in Caldwell Hall, a new building erected for the Department. The courses in soil technology are designed to afford the student in general agriculture an understanding of the fundamental principles of soil management for crop production, and also to offer opportunity for special study of important aspects of the subject, both general and specific. The former group includes a consideration of the processes of formation and classification of soils, their physical and chemical properties, and their modification

by cultural operations. It is a summation of the general knowledge of soils. In the latter group, particular phases of the subject are taken up for advanced study, in lecture, research, and seminary.

The elementary laboratory is equipped to accommodate two hundred and fifty students. The equipment includes apparatus for the study of the physical constitution of the soil, its capacity for retention and movement of water, its relation to the circulation of air, to heat, and to amount and effect of organic matter, and other important physical and chemical relations. Each student has the use of a desk and a locker containing a stock equipment.

The mechanical analysis laboratory contains equipment sufficient for thirty students. This equipment includes shakers, centrifuges, microscopes, and other apparatus necessary for the accurate mechanical analysis of soils.

The great variety of soils and soil conditions in the vicinity of Ithaca is made of use for field excursions in order to study their classification, occurrence, treatment, and management. All necessary equipment for the preparation of soil and drainage maps is provided to supplement the work in soil survey and land drainage.

For advanced study a large laboratory is provided in which each student is assigned a compartment. Special apparatus is provided in each case according to the subject under investigation.

Vegetable Gardening

The offices of the Department of Vegetable Gardening are on the second floor of the Poultry Building, and classroom and laboratory facilities are provided on the third floor. A room is set aside as a departmental library. Here are kept the collections of preserved specimens, herbarium material, photographs, lantern slides, charts, books, bulletins, and periodicals. These collections are being constantly increased.

Four glasshouses, with a head house, have been constructed as part of a new vegetable range, which now comprises about six thousand square feet of space. Adjoining the greenhouse is a frame yard, in which there are at present about one hundred and twenty-five sash. The glass is used for laboratory and departmental work in plant growing and for growing crops to maturity. The area of glass available is being increased from year to year.

A block of sandy soil about three and one-half acres in extent, located at East Ithaca, is used by the Department. This is well adapted for intensive gardening. It is equipped with service building and with irrigation apparatus illustrating several types, and provides facilities for individual field laboratory work. A half-acre plot is planted each year with the leading varieties of all the vegetables. This supplies material for the course in systematic vegetable crops. A block in Craig Field twelve acres in extent is divided for a four year rotation. The soil is rather heavy, and is utilized for the less intensive types of vegetable gardening which are practiced by the general farmer. The produce of the gardens is harvested and sold, thus giving opportunity for laboratory work in marketing.

EXPENSES, FELLOWSHIPS, SCHOLARSHIPS, AND PRIZES

Tuition in the College of Agriculture is free to undergraduate students who for a year or more immediately preceding admission have been residents of the

State of New York, and to graduate students for work taken in the College of Agriculture. The annual tuition fee* of undergraduate students from outside the State is $125 for the first and second terms. The tuition charge for the third, or summer, term is $62.50.

The tuition is payable in two installments, $70 at the beginning of the first term and $55 at the beginning of the second term. For the third term the tuition of $62.50 is payable at the opening of the term. Other fees, required of all students, are as follows:

Matriculation fee	$ 5.00
Infirmary fee, each term	3.00
Fee for baccalaureate degree	10.00

Each student in the Department of Physical Culture is required to pay a fee of $2 a term.

Each student is required to pay a fee of $2 per term for the use of a locker in the Drill Hall or Gymnasium.

Deposit fees are required in various laboratory courses; inquiry concerning these should be made before registration. Students are liable to a special charge for breakage or damage resulting from their own carelessness. Attention is called to the expenses of excursions required in various courses.

The expense for textbooks, instruments, and other necessary articles varies from $10 to $75 a year.

The University has converted the large general boarding house known as Cascadilla Hall into a dormitory for men students. The building is a four-story structure, just inside the main gate to the campus. The rooms are furnished, lighted, heated, and cared for. The rent for single rooms varies from $80 to $146 for the college year of two terms, depending on size and location. The rooms on the north side of the building are somewhat less in price than similar rooms on the south side. In case two men occupy a room, $45 should be added to the rent for the room. Many adjacent rooms connect, and two adjoining rooms may be leased by two men if desired. For particulars communicate with the Treasurer, Cornell University, Ithaca, New York.

There are many private boarding and rooming houses near the university campus. In these the cost of board and furnished room, with heat and light, varies from $5 to $12 a week. By the formation of clubs, students are sometimes able to reduce their expenses for room and board. Cafeterias are maintained in Cascadilla Hall and in the Home Economics Building.

The cost of board, with furnished room, laundry, fuel, and lights, in Sage College and Prudence Risley Hall, which are exclusively for women, varies from $290 to $320 per year. Both buildings are heated by steam and lighted by electricity. The University Adviser of Women has jurisdiction over all women students in the University, and women students are not permitted to board and lodge outside the dormitories for women, unless for special reason approved by the Adviser and subject to her direction. Inquiry regarding board and rooms at Sage College or Prudence Risley Hall should be addressed to the Business Manager of Residential Halls, Ithaca, New York.

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*All tuition and other fees may be changed or increased by the Trustees to take effect at any time without previous notice.

Scholarships and Fellowships in Agriculture

The Roberts scholarship fund, a gift of the late Dr. Charles H. Roberts, of Oakes, Ulster County, New York, provides five scholarships, each retainable for one year. As expressed by the founder, the purpose of these scholarships is to furnish financial assistance to students in the College of Agriculture who are of good moral character, who show native ability, tact, and application, and who are in need of such assistance, especially students who come from rural districts. The award is made after the close of the first term of each year. Application blanks and copies of the regulations may be obtained at the office of the Secretary of the College of Agriculture. All applications must be on the official blanks, which, with all other information, must be filed with the Secretary of the College before February 1. The value of each scholarship is $240.

Eighteen University Undergraduate Scholarships, continuing for two years and of an annual value of $200 each, are offered each year to members of the incoming freshman class. The award is made on the basis of a special competitive examination held in Ithaca in September between the period of the entrance examinations and the opening of the University. For a full description of these scholarships and examinations, see the General Circular of Information, which may be obtained from the Secretary of Cornell University.

Special attention is called to the State Scholarships established by the Legislature of 1913. Under the terms of the law, five State Scholarships shall be awarded annually to each county for each assembly district therein. Such scholarships shall entitle the holder thereof to the sum of one hundred dollars annually during a period of four years when he is in attendance on an approved college in this State. The holder may use the money to meet expenses incurred in his college course. Regulations governing the award of these scholarships may be obtained from the University of the State of New York, Albany, New York.

A graduate fellowship is awarded annually in Agriculture. Applications must be filed, on official blanks, on or before March 15.

A number of industrial fellowships are established for a limited period, usually two years, by growers, companies, and the like, who wish to cooperate with the College of Agriculture in the solution of agricultural problems. These fellowships are given to men who from their training and experience are deemed competent to undertake the work.

The Eastman Prize for Public Speaking

With the object of developing qualities of personal leadership in rural affairs, Mr. A. R. Eastman, of Waterville, New York, has established an annual prize of $100 for public speaking on country-life subjects in the College of Agriculture. This prize is designated as the Eastman Prize for Public Speaking. Competition is open to any regular or special student. The contest will take place in February.

The Stewart Prize for the Production of Clean Milk

With the object of increasing the interest in the production of clean milk, Mr. S. L. Stewart, of Brookside Farm, Newburg, New York, has offered for the coming year a prize of $50 to be divided among students participating in a clean-milk contest. This money is to be apportioned by the Department of Dairy Industry, and

the regulations governing the contest are to be fixed by the Department. Definite announcement concerning the contest will be made to students taking Dairy Industry, course 6, soon after the course opens in February.

HONOR SYSTEM

With the consent of the faculty, examinations for agricultural students are conducted under the honor system, which is administered by a Committee on Student Honor. New students are given an opportunity to become thoroughly acquainted with the regulations of the system. The regulations are printed in the Handbook of Information for students in the College of Agriculture, copies of which are available at the Secretary's office.

GENERAL INFORMATION CONCERNING COURSES

The regular instruction in the College of Agriculture constitutes a course of four years, or eight terms, leading to the degree of bachelor of science. There is a combined course with the State Veterinary College comprising seven years and leading to two baccalaureate degrees (page 26). There is a Summer School in Agriculture, six weeks in length, designed especially for teachers, school principals and superintendents, and college students. Aside from these there are winter courses, not leading to credits in the University, and opportunities for students to pursue special work. Circulars describing the winter courses and the summer school may be obtained on application to the Secretary.

The third, or summer, term. The college year in Cornell University is divided into two terms, or semesters, extending from the last of September to the early part of June. In the College of Agriculture there has been established a third, or summer, term, which continues from early June until late September. It is coordinate with the present fall and spring terms. It is open only to students who have completed the required work of the freshman and sophomore years in Agriculture, or the substantial equivalent thereof. The primary purpose of the summer term is to take advantage of the growing season in teaching certain subjects to students regularly registered in either graduate or undergraduate courses. The facilities of the College are available for graduate study throughout the summer. In addition, opportunity is provided for advanced students, teachers, and others who are otherwise engaged during the regular school year, to have the advantage of a long period of special instruction.

Students may pursue agricultural subjects in the Graduate School of the University. For full information concerning graduate work and degrees, see the Announcement of the Graduate School.

The Regular Four Year Course

Men who are candidates for admission to the regular, or four year, course must be at least sixteen years of age; women must be at least seventeen years of age. They must have certificates of good moral character, and students from other colleges or universities are required to furnish from those institutions certificates of honorable dismissal. Students are admitted on examination, or on presenting credentials of the University of the State of New York, or on acceptable school certificates.

Prospective students who have neither lived on farms nor had considerable practical experience in agriculture are urged to spend at least one year on a well-managed farm in order to familiarize themselves with common farm affairs and operations before entering the College. This experience is imperative in order to pass the farm practice requirements. (*Pages 23 and 45.*)

Candidates for admission must file their credentials and obtain permits for examination at the University Registrar's office, Morrill 10. The results of examination may be ascertained from the Registrar.

Entrance Requirements for the Four Year Course

The subjects that may be offered for admission to Agriculture are named in the following list: the figure in parenthesis following each subject indicates its value in units and shows the maximum and the minimum amount of credit allowed in the subject. A unit represents five recitations a week for one year in a study.

1a.	English No. 1	(1½)	
1b.	English No. 2	(1½)	
2a.	First Year Greek	(1)	
2b.	Second Year Greek	(1)	
2c.	Third Year Greek	(1)	
3a.	First Year Latin	(1)	
3b.	Second Year Latin	(1)	
3c.	Third Year Latin	(1)	
3d.	Fourth Year Latin	(1)	
4a.	First Year German	(1)	
4b.	Second Year German	(1)	
4c.	Third Year German	(1)	
5a.	First Year French	(1)	
5b.	Second Year French	(1)	
5c.	Third Year French	(1)	
6a.	First Year Spanish	(1)	
6b.	Second Year Spanish	(1)	
6c.	Third Year Spanish	(1)	
7a.	First Year Italian	(1)	
7b.	Second Year Italian	(1)	
7c.	Third Year Italian	(1)	
8a.	Ancient History	(½–1)	
8b.	Modern and Medieval History	(½–1)	
8c.	American History, Civics	(½–1)	
8d.	English History	(½–1)	
9a.	Elementary Algebra	(1)	
9b.	Intermediate Algebra	(½)	
9c.	Advanced Algebra	(½)	
9d.	Plane Geometry	(1)	
9e.	Solid Geometry	(½)	
9f.	Plane Trigonometry	(½)	
9g.	Spherical Trigonometry	(½)	
10.	Physics	(1)	
11.	Chemistry	(1)	
12.	Physical Geography	(½–1)	
13.	Biology*	(1)	
14.	Botany*	(½–1)	
14a.	Zoology*	(½–1)	
15.	Bookkeeping**	(½–1)	
16.	Agriculture (including home economics)**	(½–4)	
17.	Drawing	(½–1)	
18.	Manual Training	(1)	
19.	Any high school subject or subjects not already used	(½–1)	

For admission to the New York State College of Agriculture, an applicant must offer either A or B as below:

A. Fifteen units arranged as follows: English (3), history (1), elementary algebra A (1), plane geometry (1), a foreign language (3), elective (6). Solid geometry and plane trigonometry are recommended among the elective units for students entering the courses of forestry or landscape art.

B. The Arts College Entrance Diploma or the Science College Entrance Diploma issued by the Education Department of the State of New York.

Requirements for Admission of Special Students

Opportunities are provided for persons who desire to pursue special studies. In order to be eligible for admission to special work, applicants must offer two

*If an applicant has counted Biology (1) he may not also offer Botany (½) or Zoology (½).
**An applicant may offer not to exceed four units in vocational subjects under numbers 16, 18, and 19 combined. Bookkeeping may not be offered together with more than one of the subjects listed under 16, 17, and 18.

full years of recent farm experience and must also either have fifteen units of entrance credits or be twenty-one years of age. In addition an applicant for admission on the age requirement must satisfy the faculty of his ability to perform the work; and every applicant must satisfy the faculty of his bona fide desire for special study. He will be required to present an honorable dismissal from the school last attended, certificates of good moral character, and other such certificates and letters as may be desired. The special work is designed to meet the needs of young men and young women from farms who have not time for a four year course, and of mature persons who desire to spend a brief period in specialized study. The work is not a definite "course" in the sense of having a program or a prescribed set of studies. The student chooses any of the agricultural "electives" that he is fitted to pursue. Certain courses are given by some of the departments for students who lack some of the fundamental work usually required in those subjects. Admission as a special student does not admit to classes. The student is admitted to the various classes by the heads of the departments concerned.

Other Details of Admission

For other details as to subjects and methods of admission, see the General Circular of Information, which may be obtained on application to the Secretary of Cornell University, Ithaca, New York.

For admission to the freshman class and to advanced standing from other colleges and universities, all communications should be addressed to the Registrar of the University. See the General Circular of Information.

For admission as a special student, communications should be addressed to the Secretary of the College of Agriculture, and attention is called to the paragraphs on pages 28 and 29 of the General Circular of Information.

For admission to graduate work and candidacy for advanced degrees, communications should be addressed to the Dean of the Graduate School.

Requirements for the Degree of Bachelor of Science

The requirements for the degree of bachelor of science shall be residence for eight terms, and, in addition to the prescribed work in the Departments of Physical Culture and Military Science and Tactics, the completion of one hundred and twenty hours of required and elective work as outlined on pages 24–26.

All men students must satisfy the farm practice requirements (page 45) before the beginning of the senior year and must report to the Department of Farm Practice within three weeks after their first registration in the College. Exemption from these requirements is allowed only to students specializing in the Departments of Botany, Home Economics, Forestry, Entomology, or Landscape Art; application for such exemption must be made at the office of the Secretary.

Credit toward a degree for work done in a preparatory school on subjects that may be offered for entrance to the University will be given to those students only who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. These examinations will cover substantially the same ground as the university courses in the subjects. An applicant desiring a college-credit examination of this kind must apply to the Registrar as early as possible, and in no case later than September 15, 1916, specifying which fifteen units he intends to offer in satisfaction of the entrance

requirements, and on what other entrance subjects he wishes to be examined for credit. In case he fails to satisfy the entrance requirements in any one or more of the units on which he proposes to enter, but passes the credit examination in any other subject or subjects, he may use the latter toward satisfying entrance requirements, but in that case he cannot also receive college credit for it. The college-credit examinations will be held in September, on the dates set for the entrance examinations in the same subjects.

A student who receives at entrance twelve or more hours of credit in addition to the requirements for admission, may be regarded as having satisfied one term of residence. Under no circumstances shall surplus entrance credit be accepted as the equivalent of more than one term.

A student who has satisfied the entrance requirements of this College and has afterward completed in two or more summer sessions in Cornell University at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in summer sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit toward the degree of bachelor of science which is allowed for the work of any one summer session is seven hours.

A student admitted to the College of Agriculture from another college in Cornell University, or from any other institution of collegiate rank, will be regarded as having completed the number of terms and hours to which his records entitle him, and will receive all the privileges of students who have completed the same number of terms and hours by residence in the College. In order, however, to obtain the degree of bachelor of science, he must have completed the prescribed subjects in the four year course and the requisite number of elective hours in agricultural subjects. He must also have been in residence in the College of Agriculture for his last two terms and have completed not less than fifteen hours a term, of which two-thirds, at least, must be subjects taught by the staff of the College of Agriculture.

A student must register for at least twelve hours each term, and no new student may register for more than eighteen hours.

Regular students may take at their discretion during their four years not to exceed twenty hours of elective subjects in courses offered in other colleges than Agriculture; but such elective subjects shall not interfere with required or back work. Special students must take at least two-thirds of the entire work of each year from the agricultural subjects described on the following pages.

The Course Leading to the Degree of Bachelor of Science*

Freshman year	Number of course	Hours 1st term	Hours 2d term
English	1	4	4
Chemistry	1	6	–
Chemistry	85 or 6.	–	4 or 5
Biology	1	3	3
Physics**	2	–	5
The Farm	1	2	–
Electives†		0–3.	4–7
Total		15–18	15–18

*The required courses given in other colleges than Agriculture are announced on pages 76–78.
**May be taken in second term of sophomore year.

Sophomore year	Number of course	Hours 1st term	Hours 2d term
Geology‡	1	3	–
Chemistry	85	–	4
Physiology, one of the following§:			
Physiology of Domestic Animals	10	3	–
Human Physiology	3	–	3
Plant Physiology	20 or 21	–	4–5
Botany or Zoology	1	6	–
Zoology	1	5	–
Electives		7–10	6–11
Total		15–18	15–18

In addition to the above, the required work in military drill and physical training must be taken.

Political Science 51 may be taken this year.

Junior year	Number of course	Hours 1st term	Hours 2d term
Political Science	51	3	3

Elective Subjects and Group Requirements

The remainder of the work is made up of electives to be taken under the following restrictions:

A student may take at his discretion during his four years not to exceed twenty hours of elective subjects in courses offered in other colleges than Agriculture; but such elective subjects shall not interfere with required or back work. The remainder of his elective work must be offered from the agricultural subjects described on the following pages.

In selecting the subjects in the major group in Agriculture, the student must obtain the advice and approval of a professor or an assistant professor having charge of a subject within the group and preferably within the department in which he expects to specialize, who shall be chosen by the student at the beginning of the sophomore year. Students expecting to specialize in forestry, landscape art, rural education, or home economics must take as their advisers professors or assistant professors in those departments. All students who are preparing for teaching are recommended to consult the Professor of Rural Education as well as their Faculty Adviser before filing their term schedules.

All students must have passed before graduation at least fifteen hours of agricultural electives in one of the groups named below, and at least three hours in each of three of the other groups:

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‡Optional for students taking a major in home economics.
§May be taken in junior or senior year by special permission.

Group A—Farm Crops
Pomology
Soil Technology
Floriculture
Vegetable Gardening
Group B—Animal Husbandry
Poultry Husbandry
Dairy Industry
Entomology
Group C—Agricultural Chemistry
Botany
Plant Breeding
Plant Pathology
Meteorology
Group D—Rural Economy
Rural Education
Farm Management
Extension
Rural Engineering
Drawing
Group E—Forestry
Home Economics
Landscape Art

GRADUATED CREDIT

Beginning with the first term of 1916–17 the passing grades are to be designated A, B, C, D, and P. Beginning with the class of 1920 students receiving the grade of C are to receive normal credit toward graduation; grade B, 10 per cent additional credit; grade A, 20 per cent additional credit; grade of D, credit reduced 10 per cent and grade of P, credit reduced 20 per cent. No student may be graduated in less than eight terms unless his work in the College of Agriculture averages 15 per cent excess credit.

Combined Course in Agriculture and Veterinary Medicine

A regular student may be registered in both the College of Agriculture and the New York State Veterinary College with the following restrictions:

1. Completion of all the required work of his course.
2. Credit of ninety hours, none of which is in the Veterinary College.
3. Permission of both the faculties concerned.

Such a student may be recommended for his degree in the College of Agriculture when he has met the following requirements:

1. Completed thirty hours of which not less than twelve shall be taught in the New York State College of Agriculture.
2. Has met both the group and agricultural elective requirements of the College of Agriculture.

On completion of the remaining three years if he meets the requirements of the State Veterinary College, he will receive the degree of doctor of veterinary medicine.

DEPARTMENTS OF INSTRUCTION

WITH OUTLINES OF COURSES THAT MAY BE CHOSEN BY REGULAR OR SPECIAL STUDENTS AS AGRICULTURAL ELECTIVES

ELECTIVE COURSES OPEN TO FRESHMEN

Dairy Industry 1, 2, 3, 6, 14; Drawing 1, 2; Floriculture 1, 9; Forestry 6; Landscape Art 2, 3, 13; Home Economics 2; Meteorology 1; Nature Study 61; Poultry Husbandry 1, 10; Rural Economy 1; Rural Engineering 3, 20, 30; Vegetable Gardening 1.

SPECIAL NOTICE

The first term begins with the opening of the college year in September. The second term begins in February. The third, or summer, term begins in June. (See Calendar, page 2.) The terms are coordinate.

Unless otherwise noted, all courses are given in the buildings of the College of Agriculture. Courses enclosed in brackets will not be given in 1916–17.

AGRICULTURAL CHEMISTRY

85. **Agricultural Chemistry.** First or second term, credit four hours. Prerequisite Chemistry 1. Lectures, T Th S, 11. Recitations at hours to be arranged. Place to be announced. Professor CAVANAUGH.

A general course treating of the relation of chemistry to agriculture and dealing with the composition and chemical properties of plants, soils, fertilizers, feedstuffs, insecticides, and fungicides.

85a. **Agricultural Chemistry, Laboratory Course.** First or second term, credit two hours. Prerequisite Chemistry 1, 6, 85. T Th, 2–4.30. Place to be announced. Mr. CONLIN.

This course is designed to accompany course 85. Students electing advanced courses in agricultural chemistry, courses 86–90, are advised to take elementary organic chemistry.

86. **Agricultural Chemistry, Advanced Course.** First term, credit three hours. Prerequisite course 85a. Lectures, time and place to be arranged. Professor CROSS.

The methods of the Association of Official Agricultural Chemists are studied in the analysis of fertilizers, soils, and insecticides.

87. **Agricultural Chemistry, Laboratory Course.** First term, credit three hours. M W, 1.30–5.30. Place to be arranged. Assistant Professor RICE.

This course is designed to accompany course 86.

88. **Agricultural Chemistry, Laboratory Course.** Second term, credit three hours. M W, 1.30–5.30. Place to be arranged. Assistant Professor RICE.

This course is designed to accompany course 89.

89. **Agricultural Chemistry, Advanced Course.** Second term, credit three hours. Prerequisite course 85a or 93. Lectures, time and place to be arranged. Professor CROSS.

Methods of the Association of Official Agricultural Chemists are studied in the analysis of foods, feedstuffs, sugars, and dairy products.

90. **Advanced Agricultural Analysis.** First or second term, credit and hours to be arranged. Prerequisite courses 86 and 87, or 88 and 89. Professor CAVANAUGH or Professor CROSS.

Designed to meet the needs of those who wish to do research in agricultural chemistry.

92. **Household Chemistry.** First or second term, credit two hours. Prerequisite courses 1, 6, 32. Lectures, time and place to be arranged. Professor CAVANAUGH.

Designed for students of home economics.

93. **Household Chemistry, Laboratory Course.** First or second term, credit two hours. First term, time and place to be arranged; second term, T Th, 8–10.30, place to be arranged. Assistant Professor RICE.

Designed to accompany course 92.

ANIMAL HUSBANDRY

Students intending to specialize in animal husbandry are advised to register for courses 1 and 2 before taking the more advanced courses. Attention is also directed to courses 40 and 41 in the College of Veterinary Medicine as especially adapted to the needs of these students.

1. **Principles and Practice of Feeding Animals.** First or second term, credit two hours. Lectures, F, 9. Animal Husbandry Building A. One practice period a week, daily except S, 2–4.30, by appointment. Animal Husbandry Building. Professor SAVAGE and Mr. BAKER.

The general principles of animal nutrition, including the study of feeding standards, the common grain and commercial feeds, the formulation of rations, and the like.

2. **Principles of Animal Breeding.** First or second term, credit three hours. Lectures, T Th, 9. Practice, T or F, 2–4.30. Animal Husbandry Building A and Judging Pavilion. Professor WING, and Messrs. MEADE and ALLEN.

A general outline of the principles of heredity as applied to the breeding of animals, with a study of animal form, origin and formation of breeds, crossing, and grading; an outline of the methods of registration; and the study of records and pedigrees. Demonstrations, essays, and reports will be required as supplementary to the lectures.

5. **The Horse.** Second term, credit four hours. Lectures, M W F, 11. Animal Husbandry Building A. Practice, M, W, or Th, 2–5. Judging Pavilion. Professor HARPER, and Messrs. MEADE and HAM.

History and characteristics of breeds, selection, judging, breeding, feeding, care, training, and development of the horse.

6. **Horse Training, Practical Course.** First term, credit two hours. Prerequisite course 5; registration limited, admission by permission only. Lectures, F, 9. Animal Husbandry Building. Practice, in sections by appointment. Animal Husbandry Building and barns. Professor HARPER and Mr. HAM.

A practical course in the feeding, training, and stable management of horses.

[7. **Mechanics of the Horse.** First term, credit three hours. Will not be given unless elected by at least five students. Prerequisite course 5. Lectures and recitations, M W, 11. Practice, M, 3.30–5. Animal Husbandry Building. Professor HARPER.] Not given in 1916–17.

Lectures on animal mechanics, animal proportions, and the relation of the latter to specific uses. Practice in measuring animals and in testing the value of given measurements for given purposes.

10. **Dairy Cattle.** First term, credit four hours. Lectures, M W, 9. Practice, M, W, or Th, 2–3.30, by appointment; also, daily attendance at the barns for practice in feeding and stable management for three weeks, in groups as assigned. Animal Husbandry Building A, Judging Pavilion, barns, and stables. Professor WING, and Messrs. MEADE and ALLEN.

Origin, history, and development of the breeds of dairy cattle; production of milk; economy of feeding, care, management, and sanitation of the dairy herd;

maintenance of the herd; raising calves. Practice in judging, scoring, milking, and feeding.

11. **Beef Cattle, Sheep, and Swine.** First term, credit three hours. Lectures, T Th, 11. Practice, T, 2–3.30, or S, 10.30–12. Animal Husbandry Building A. Mr. SEULKE and assistants.

Origin, history, and development of the breeds of beef cattle, sheep, and swine; methods of beef, mutton, and pork production, especially as based on the results of experiments. Practice in judging beef cattle, sheep, and swine. Reports on topics assigned will be required.

12. **Meat and Meat Products.** First or second term, credit three hours. Registration by appointment and limited to forty. Lectures, M, 8. Practice in two sections, M Th, 2–4.30, W F, 2–4.30, or T, 2–4.30, and S, 8–10.30. Animal Husbandry Building B, and Meat Laboratory. Mr. SEULKE.

One required inspection trip to Buffalo and vicinity.

A practical course in slaughtering farm animals, the cutting of carcasses, and the preparation and curing of corned, dried, and salted meats.

14. **The Microscopic Study of Feeds for Animals.** Second term, credit two hours. Practice, T Th, 2–4.30. Registration by appointment only, for those who have had a good preliminary training in the use of the microscope. Animal Husbandry Building 21. Assistant Professor MAYNARD.

This course is planned for advanced and graduate students, that they may become familiar with those manufacturing processes that yield by-products suitable for feeding animals, the by-products themselves, and materials that may be used as adulterants in feeds for animals, with methods for detecting them.

15. **Principles of Feeding, Advanced Course.** Second term, credit two hours. Prerequisite course 1 and Veterinary Physiology 12. For advanced and graduate students. Lectures, M W, 9. Animal Husbandry Building. Professor SAVAGE.

16. **Principles of Breeding, Advanced Course.** First and second terms, credit from one to three hours a term. Not given first term in 1916–17. Prerequisite courses 5 and 10. Lectures, M, 10. Animal Husbandry Building. Professors WING and HARPER.

Lectures, conferences, and reports, including statistical methods as applied to breeding animals. The work of the first term will consist in large part of practice in making reports on statistical problems; the work of the second term will be chiefly individual, and will afford opportunity for intimate and close study of the various breeds of improved stock.

17. **Animal Husbandry, Advanced Course.** Research, investigation, and practice, for advanced and individual work. Hours to be arranged Animal Husbandry Building. Professors WING, SAVAGE, and HARPER, and assistants.

[20. **General Elementary Course in Animal Husbandry.** For students in the New York State Veterinary College only. Throughout the year, credit three hours each term. Two lectures and one practicum each week. Animal Husbandry Building. Professors WING, HARFER, and SAVAGE.] Not given in 1916–17.

The general principles of breeding and feeding domestic animals with practice in the formulation of rations and the judging and scoring of animals.

BOTANY

1. **General Botany.** First and second terms, credit six hours. Course limited in both terms to such numbers of students as will be announced at the registration periods. Lectures, M W F, 9, or M W F, 11. Lecture sections limited to one hundred students each. Roberts Hall 292. Laboratory, three periods of two and one-half hours each. Laboratory sections are limited to twenty students each. Students must consult the Department in regard to laboratory and lecture appointments before registering for the course. Assistant Professor SCHRAMM, Messrs. BECHTEL, WANN, ERICKSON, GAGE, METCALF, and others.

This course is designed to furnish a general knowledge of the fundamental facts and principles of plant life. A careful study is made of form, structure, and reproduction of representatives from the principal groups, with a view to orient the student in the plant kingdom and to acquaint him with the principal evolutionary tendencies exhibited. Laboratory fee, $5.

2. **Forest Botany.** First term, credit three hours. Prerequisite course 1 or its equivalent. Lectures, T, 8. Agronomy 192. Laboratory or field work, T Th, 2–4.30, or M W, 2–4.30. Agronomy Building, Botanical Laboratory. Mr. MACDANIELS, assisted by Mr. MUNZ.

A course dealing with the identification of trees and shrubs, both in summer and in winter, and with other problems relating to forest plants. Adapted to the needs of all students wishing a technical knowledge of trees and shrubs. Laboratory fee, $3.

4. **Microscopic Wood Technology.** First term, credit two hours. Prerequisite courses 1 and 2 or an equivalent. Two laboratory periods of two and one-half hours each with a few lectures during the periods. Laboratory, T Th, 8–10.30. Agronomy Building, Botanical Laboratory. Assistant Professor EAMES.

This course is planned for students specializing in wood technology. The microscopic anatomy of wood will be studied from the following standpoints: the relation of structure to important properties and uses; the identification of many commercial timbers; the problem of wood preservation and of fireproofing by impregnation with chemicals; the determination of the source and nature of wood pulp, including tests of various papers. Considerable attention will be given to the types of commercial fibers, their identification, and uses. Laboratory fee, $4.

5. **Grasses.** Second term, credit two hours. Prerequisite course 1 or its equivalent. Lectures, W, 8. Laboratory, W, 9–12. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. METCALF

A course designed especially to furnish instruction in the morphology, classification, and identification of wild and cultivated grasses, to students in farm crops and general agriculture. Open also to other students interested in grasses. Laboratory fee, $2.

6. **Taxonomy of the Higher Plants.** Second term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, M, 8. Laboratory, T Th, 2–5. The remaining work by appointment. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. METCALF.

Identification, classification, and ecology of the seed plants and ferns: a detailed study of the local flora about Ithaca with reference to the identification of species and varieties, to the classification and nomenclature of local plants, and to a study of their floral and foliar characteristics. The course consists largely of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological associations and modifications of the various species and varieties will be noted. Instruction will be given in the preparation of an herbarium and in the preparation of keys. Laboratory fee, $4.

6a. **Taxonomy of the Higher Plants.** Third term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, M, 9. Agronomy Building 192. Laboratory, W, 8–1, 2–5. Remaining work by appointment. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. METCALF.

Same as course 6, but dealing with the summer instead of the spring flora. Students are advised to take this work in summer, when there is available a far greater abundance of living material. Laboratory fee, $4.

7. **Weeds and Weed Seeds.** Third term, credit two hours. Prerequisite course 1 or its equivalent. Lectures, M, 11. Laboratory, Th, 2–5. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. METCALF.

This course is designed to meet the needs of students of agriculture who wish to obtain a working knowledge of weeds and weed seeds. It will also aid persons

intending to teach nature study and agriculture in the schools. Laboratory fee, $2.

8. **Special Taxonomy of the Ornamental Herbaceous Plants.** Second term, credit three hours. Prerequisite course 1 or its equivalent, taken previously or at the same time. Lectures, W, 12. Agronomy Building. Laboratory, M W, 2–4.30. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. ———.

Ornamental plants will be considered from the standpoint of general morphology, terminology, and botanical classification. Training in identification and the preparation of herbaria will be given. The botanical literature dealing with garden plants will receive consideration. Laboratory fee, $3.

9. **Histology.** First and third terms, credit four hours. Prerequisite course 1 or its equivalent. Lectures, F, 12. Agronomy Building 203. Laboratory, M W F, 8–10.30. Agronomy Building, Botanical Laboratory. Assistant Professor EAMES and Mr. MACDANIELS

This course is designed to give a knowledge of the structure and morphology of plant tissues and organs. Emphasis will be placed on the relation of structure to function, and on the modification due to phylogenetic development and to ecological factors. Traumatic and pathogenic tissues, and the effect of parasitism, symbiosis, and other factors on the various tissues, will be studied. Laboratory work will include methods and practice in microtechnique. Much practice will be given in the determination, in section, of types of organs, tissues, cells, and secretions. Laboratory fee, $5.

10. **Cytology.** Second term, credit two hours. Prerequisite course 1 or its equivalent. Lectures, M, 9. Laboratory, M, 10.30–1. Agronomy Building, Botanical Laboratory. Assistant Professor SHARP and Miss HANCY.

This course is planned to give instruction in the morphology and physiology of the cell, and in the cytological aspects of reproduction and inheritance. In the laboratory a study is made of material illustrating the subjects dealt with in the lectures. Laboratory fee, $4.

11. **Methods in Histology and Cytology.** First term, credit three hours. Prerequisite course 1 or its equivalent. Laboratory, M W F, 2–4.30. Occasional lectures are given during the laboratory periods. Agronomy Building, Botanical Laboratory. Assistant Professors EAMES and SHARP.

A course designed to acquaint the student with methods employed in preparing material for histological and cytological study. Laboratory fee, $5.

12. **Comparative Morphology of Algæ and Fungi.** Second term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, T Th, 8. Agronomy Building. Laboratory, T Th, 2–4.30. Agronomy Building, Botanical Laboratory. Assistant Professor SCHRAMM and Mr. THOMAS.

An advanced course embracing a study, principally from the standpoint of comparative morphology and relationships, of selected types of algæ and fungi. Laboratory fee, $5.

Courses 12, 13, and 14, one term each, are designed to cover the field of comparative morphology. Although credit is given for each course separately courses 13 and 14 should be taken in the order stated, and as far as possible course 12 should precede them.

13. **Comparative Morphology of Bryophytes and Pteridophytes.** First term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, T Th, 9. Agronomy Building 192. Laboratory, T Th, 10.30–1. Agronomy Building, Botanical Laboratory. Assistant Professor SHARP and Miss HANCY.

An advanced course embracing comparative and developmental studies of bryophytes and pteridophytes. Emphasis is placed on evolutionary and reproductive features. Laboratory fee, $5. See statement under course 12.

14. **Comparative Morphology of Spermatophytes.** Second term, credit four hours. Prerequisite course 1 or its equivalent, and course 13. Lectures, T Th, 9.

Agronomy Building 192. Laboratory, T Th, 10.30–1. Agronomy Building, Botanical Laboratory. Assistant Professor SHARP and Miss HANCY.

An advanced course designed to follow course 13, and dealing in a similar way with the structure and development of gymnosperms and angiosperms. Laboratory fee, $5. See statement under course 12.

20. **General Plant Physiology.** First or second term, credit four hours. Prerequisite all freshman work or its equivalent, and course 1. This course may be taken to satisfy the requirement in physiology. Students must consult the Department with respect to laboratory assignments before registering for the course. First term: Lectures, T, 10. Roberts Hall 292. Recitations, four sections, Th, 10. Roberts Hall 292, Agronomy Building 192, Forestry Building 126, Forestry Building 210. Laboratory, four sections. Agronomy Building 21. Second term: Lectures, T, 10. Recitations, seven sections: 1 section, W, 9, Agronomy Building 192; 4 sections, Th, 10, Roberts Hall 292, Home Economics Building 100, Agronomy Building 192, Forestry Building 210; 1 section, Th, 8, Agronomy Building 192; 1 section, F, 12, Agronomy Building 192. Laboratory, 5 sections. Professor KNUDSON, and Messrs. CURTIS, BRANNON, KNOWLTON, BENSON, and others.

The topics include absorption, nutrition, relations to environment, growth, reproduction. and propagative processes. Laboratory fee, $4. Breakage fee, $2.

21. **Plant Physiology, Advanced Course.** First and second terms, credit five hours a term (see note). Prerequisite an adequate training in botany and chemistry, to be determined in each case by the Department; recommended for the senior year. Lectures, W F, 10. Agronomy Building 192. Laboratory, M, 2–5, S, 8–11. Agronomy Building 21. Professor KNUDSON, and Messrs. CURTIS, BRANNON, and KNOWLTON.

Lectures, laboratory practice, and reports. This is a comprehensive course in physiology and requires good fundamental preparation on the part of the student. The course is designed for students specializing in plant study, including the applied lines. Laboratory fee, $4.50 a term. Breakage fee, $2 a term.

NOTE: This course is also given in the third term (omitted in 1917). It is then divided, however, into two five-hour courses, the student being permitted to take either course or both courses.

[26. **Physiology of Fermentation.** First term, credit three hours. Prerequisite required work through the sophomore year, bacteriology, and course 20 or 21. Lectures, T, 12. Agronomy Building 192. Laboratory by appointment. Agronomy Building 21.] Not given in 1916–17.

A course in technical microbiology in its relation to fermentation. The course deals primarily with yeasts, molds, and bacteria that are concerned in the more important fermentation processes. Recommended for graduates and undergraduates who are specializing in physiological, bacteriological, or pathological work. Laboratory fee, $5.

Courses intended primarily for graduates

[15. **Special Morphology and Physiology of the Algæ.** First term, credit three hours (or more by permission). Prerequisite course 12 or its equivalent. Lectures, Th, 8. Laboratory, by appointment. Agronomy Building, Botanical Laboratory. Assistant Professor SCHRAMM.] Not given in 1916–17.

A critical study of the groups of algæ from the standpoint of forms of organs, general life processes, and reproduction. Relationship and descent will be considered. This course is intended to furnish technical training and critical information in algology beyond the general knowledge obtained in course 12. Laboratory fee, $4.

18. **Research in General Botany, Taxonomy, Histology, Cytology, and Algæ.** Throughout the year, credit not less than three hours a term, by appointment. Professor WIEGAND, Assistant Professors EAMES, SHARP, and SCHRAMM.

A course designed for graduates and advanced students. Original investigations by students who are adequately prepared. The laboratory fee depends on the nature of the work.

19. **Seminary in Taxonomy, Morphology, Cytology, and Histology.** Throughout the year, credit one hour a term. Credit restricted to graduate students in the Department. Hours to be arranged. Professor WIEGAND, assisted by Assistant Professors EAMES, SCHRAMM, and SHARP.

Broad problems pertaining to botany will be discussed, literature will be reviewed, and reports of research will be given.

30. **Special Chapters in Metabolism.** Third term, credit one hour or more. Lectures and laboratory. Professor KNUDSON.

A study of some of the more important temporary and storage products of plant metabolism. Open only to graduates, or to undergraduates who have had course 21 and organic chemistry.

31. **Seminary in Plant Physiology.** Throughout the year, credit one hour a term. Limited to graduates taking work in the Department. Conferences, F, 11. Agronomy Building 192. Professor KNUDSON.

In the first and third terms topics for discussion will be chosen from current work in plant physiology. In the second term, special outlines will be followed, and reports on research studies presented.

33. **Research, General Physiology.** Throughout the year. Credit for major or minor, otherwise not less than four hours a term. Prerequisite adequate training in botany, chemistry, and physiology. By appointment. Agronomy Building 192. Professor KNUDSON.

In this course, problems in plant physiology and in the general relation of plant physiology to agriculture will be assigned for investigation. Reports on these will be required. The amount of laboratory fee is governed by the nature of the work.

DAIRY INDUSTRY

1. **Milk Composition and Tests.** First or second term, credit three hours. For regular students only. Students must consult the Department in regard to laboratory assignments before registering for the course. First term: lectures, T S, 11, Dairy Building 222; practice, M or T, 2–4.30, or S, 8–10.30, Dairy Building 232. Second term: lectures, T S, 11, Dairy Building 222; practice, W, 8–10.30, 2–4.30, Th, 10.30–1, or S, 8–10.30, Dairy Building 232. Professor TROY, and Messrs. MCINERNEY and JACKSON.

The topics considered are secretion and composition of milk, samples, the lactometer, the Babcock test for fat, acid tests, moisture tests, salt tests, preservative tests, and adulterations. Laboratory deposit, $3, part returnable.

2. **Butter.** First or second term, credit three hours. Must be preceded or accompanied by course 1; should be preceded or accompanied by courses 4, 6, and 8; for regular students only. Lectures, F, 11. Dairy Building 222. Practice, T or F, 1–6, or S, 8–1. Dairy Building. Professor GUTHRIE and Mr. SCOVILLE.

This course considers the principles and practice of butter making in farm dairies and creameries, cream separation, pasteurization, starters, cream ripening, churning, judging, marketing, and the like. Laboratory deposit, $2, part returnable.

3. **Cheese.** First term, credit three hours. Must be preceded by course 1 or 16; should be preceded or accompanied by course 8. Lectures and recitations, Th, 11. Dairy Building 222. Practice, M, W, or Th, 1–6. Cheese Laboratory. Assistant Professor FISK and Mr. ELLENBERGER.

In this course are considered the principles and practice of cheddar-cheese making, starter making, buildings and equipment, factory bookkeeping, judging, and marketing. Laboratory deposit, $2.50, part returnable.

4. **Bacteriology, Elementary Course.** First term, credit four hours. For regular students only, except by special permission. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, M, 8. Dairy Building 222. Practice, M W F, 2–5. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, M, 10–1, W F, 8–11.) Dairy Building 122. Professor STOCKING, and Messrs. SUPPLEE and BESEMER.

The purpose of this course is to give a working knowledge of microbiology, and to prepare students for work in the different fields of bacteriology such as pertain to soils, plant diseases, the household, or dairying. The course includes preparation and care of bacteriological apparatus; preparation of culture media; sterilization; occurrence and distribution of bacteria; methods of study, including the study of morphology, cultural characteristics, chemical changes, and isolation and identification of species. Laboratory deposit, $4, part returnable.

6. **Market Milk and Milk Inspection.** Second term, credit two hours. Must be preceded or accompanied by course 1 or 16; should be preceded or accompanied by courses 4 and 8. Lectures, W, 12. Dairy Building 222. Practice, S, 8–10.30, or 10.30–1. Dairy Building. Professor ROSS and Mr. BAUDER.

Attention is given to the production and control of market milk, with special reference to its improvement; milk as food; shipping stations; transportation and sale; pasteurizing; standardizing; clarification; certified milk; milk laws; duties of milk inspectors; apparatus and buildings. The practice includes also visits to dairies in the vicinity of Ithaca. A required two-days inspection trip in the neighboring counties may be arranged. Laboratory deposit, $3, part returnable.

7. **Testing, Advanced Course.** Second term, credit two hours. Must be preceded by course 1; not open to first and second year students, except by special permission. Laboratory will not accommodate more than fifteen students. Students must consult the Department in regard to laboratory assignments before registering for the course. T Th, 2–5. Dairy Building 202. Professor TROY, and Messrs. MCINERNEY and JACKSON.

This course includes work in such subjects as the determination of moisture and dry matter in dairy products; commercial tests for casein; various tests for butterfat; commercial tests for butter and oleomargarine; preservatives and adulterations; milk modification. Laboratory deposit, $3, part returnable.

8. **Dairy Bacteriology.** Second term, credit four hours. Must be preceded or accompanied by course 1 and preceded by course 4 or its equivalent; open to regular students only. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, Th, 11. Dairy Building 222. Practice, M W F, 2–4.30. Dairy Building 122. Professor STOCKING, and Messrs. SUPPLEE and BESEMER.

This course deals with the sources of milk bacteria and methods of controlling their growth; bacteriological studies of market milk and other dairy products; different species of dairy bacteria; the making of starters; effect of straining; separation, pasteurization, and temperature; bacteriological methods of city milk inspection. Laboratory deposit, $4, part returnable.

9. **Butter, Advanced Course.** Second term, credit three hours. Must be preceded by a good record in course 2. (In special cases students who have done exceptionally good work in course 18 may be admitted.) Lectures, F, 12. Dairy Building 222. Practice, one long period each week by appointment; the periods will begin at the opening of the creamery in the morning and will close at 12 o'clock. Dairy Building. Professor GUTHRIE.

Attention will be given to creamery management; creamery records and accounts; organization; location, plans, and construction of creamery buildings. Outside reading will be required. The practice will consist of practical work in the creamery, where from six hundred to one thousand pounds of butter are made daily. The work will include receiving milk and cream; separating; ripening cream; starter culture; the manufacture, wrapping, packing, and judging of butter. If a sufficient number of students desire it, a voluntary trip to the

New York City markets will be arranged for the Easter vacation. Laboratory deposit, $2, part returnable.

10. **Fancy Cheese.** Second term, credit two hours. Must be preceded by course 1 or 16 and course 3. Practice, T or W, 1–6. Dairy Building 132. Assistant Professor FISK and Mr. ELLENBERGER.

The manufacture of certain brands of fancy cheese is given attention in the course. Laboratory deposit, $2, part returnable.

11. **Ice Cream.** Second term, credit two hours. Must be preceded by course 1 or 16, and course 14 or its equivalent. Lectures, M, 8. Dairy Building 222. Practice, M, 2–4.30, or Th, 8–10.30. Laboratory facilities limited. Students must consult the Department before registering. Dairy Building E 122. Assistant Professor FISK and Mr. ELLENBERGER.

The topics considered are the manufacture of different kinds of ice cream and sherbets, and types of machinery used. A required inspection trip to ice-cream plants will be arranged. Laboratory deposits, $2, part returnable.

12. **Seminary.** First or second term, credit one hour. For advanced students; required of graduate students taking work in the Department. T, 4.30–5.30. Dairy Building. Professors STOCKING, ROSS, TROY, and GUTHRIE, and Assistant Professor FISK.

13. **Research.** First or second term, credit one or more hours, by arrangement. For advanced students. Practice, hours by appointment. Dairy Building. Professors STOCKING, ROSS, TROY, and GUTHRIE, and Assistant Professor FISK.

Special problems in any line of dairy work can be taken up in this course, according to the needs of the student. Facilities are provided for investigative work. Laboratory deposit, $2, for each credit hour, part returnable.

14. **General Agricultural Bacteriology.** First term, credit three hours. Open to regular and special students who desire a general knowledge of bacteria in relation to agricultural problems, but cannot spend time for the more thorough courses. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, W, 10. Dairy Building 222. Practice, T Th, 2–5. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, T Th, 8–11.) Dairy Building 122. Professor STOCKING, and Messrs. SUPPLEE and BESEMER.

The characteristics of bacteria, their distribution and place in nature; fermentations; bacteria in air, water, and sewage; the manure heap; soil bacteria; nitrogen fixation; relation of bacteria to the dairy and its products; the preservation of farm products, including fruits, vegetables, vinegar, silage. Laboratory deposit, $4, part returnable.

15. **Bacteriology for the Home.** Second term, credit three hours. This course is intended for students in home economics. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, S, 11. Home Economics Building 245. Practice, T Th, 2–5. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, T Th, 8–11.) Dairy Building 122. Messrs. SUPPLEE and BESEMER.

This course considers the nature of bacteria and methods for studying them; the relation of bacteria to air and to water, milk, and other foods; canning and preserving; molds and yeasts in their relation to household problems. Laboratory deposit, $4, part returnable.

16. **Milk Composition and Tests.** Second term, two hours, without credit toward graduation. Similar to course 1; for special students only. Lectures, W, 11. Dairy Building 222. Practice, S, 8–10.30. Dairy Building 232. Professor TROY, and Messrs. MCINERNEY and JACKSON. Laboratory deposit, $3, part returnable.

18. **Butter.** Second term, three hours, without credit toward graduation. Must be preceded or accompanied by courses 6 and 16; for special students only. Lectures, F, 11. Dairy Building 222. Practice, F, 1–6. Dairy Building. Professor GUTHRIE and Mr. SCOVILLE. Laboratory deposit, $2, part returnable.

19. **Cheddar Cheese, Advanced Course.** Second term, credit two hours. Prerequisite a good record in course 3. Lectures and outside reading in connection with laboratory work. Practice, one long period each week, T or Th; each exercise will begin at 11 o'clock and close when the work is done. Cheese Laboratory. Assistant Professor FISK.

This course considers some of the commercial and scientific problems of cheddar-cheese making, starter making, judging, and marketing. A required trip to neighboring cheese factories will be arranged. Laboratory deposit, $2, part returnable.

DRAWING

1. **Mechanical Drawing.** First or second term, credit three hours. Students must register for not less than three hours. Lectures during practice. Practice, M W, 2–4.30, or T Th, 2–4.30. The two remaining two-hour practice periods by appointment. Dairy Building 341. Mr. REYNA.

The drafting room will accommodate but thirty students in each section. Those registering in the course will be assigned to desks in the order of registration in the Department. Therefore, in order to obtain a place it will be necessary to report promptly to the Department. A small amount of outside reading will be required.

Work will begin with the first afternoon period. Students must consult the Department before that period as to materials required.

2. **Free-hand Drawing.** First and second terms, credit two or more hours a term. Students may not enter the second term unless they have taken the course in the first term, or its equivalent. Students must register for not less than two hours in either term. Lectures during practice. Practice by appointment. First term, daily except S, 8–1 and 2–4.30, S, 8–1. Professor BAKER and Miss GARRETT. Second term, daily, 8–1. Miss GARRETT. Dairy Building 371.

An elementary course for the development of graphic expression applicable to scientific studies. Of special value to those who expect to enter the field of teaching, nature study, or biological research. The course aims also to develop the student's appreciation of pictures. As this course is laid out for two terms, students are advised against planning to take only the work of the first term.

Since there are no lectures nor required reading in this course, one hour of credit in free-hand drawing means three hours of actual practice. The drawing periods must be at least two actual hours in length. Students must report promptly to the Department for list of materials, so as to begin work with the first period scheduled.

2a. **Free-hand Drawing and Outdoor Sketching.** Third term, credit from two to five hours. Prerequisite course 2 or its equivalent. Students must register for not less than two hours. Lectures during practice. Practice by appointment, M T W F, 8–12, T Th, 2–5. Dairy Building 371. Professor BAKER.

While this course is intended primarily for students in landscape art—being out-of-door study, in pencil, pen and ink, and water color, of foliage, tree growth and architecture—provision is also made for the general student and for teachers of drawing in the secondary schools.

3. **Free-hand Drawing, Advanced Course.** First or second term, credit two or more hours. Prerequisite course 2 or its equivalent. Students must register for not less than two hours. Lectures during practice. Practice by appointment. First term, daily except S, 8–1 and 2–4.30, S, 8–1. Professor BAKER and Miss GARRETT. Second term, daily, 8–1. Miss GARRETT. Dairy Building 371.

Personal instruction in pencil, pen and ink, charcoal, wash, and water-color drawing.

4. **Perspective.** Second term, credit two hours. Prerequisite course **2** or its equivalent, and descriptive geometry. For students in landscape art. Lectures, W, 9. Drafting period, S, 8–1. Mr. REYNA.

A course in appearance representation from plan and elevation.

ENTOMOLOGY, LIMNOLOGY, NATURE STUDY, AND ORNITHOLOGY

Biology

1. **General Biology.** First and second terms, credit three hours a term. Lectures, M W, 9, or T Th, 9. Roberts Hall 131. One practice period a week, T, W, Th, F, or S, 8–10.30, daily, 10.30–1, or daily except S, 2–4.30. Roberts Hall 302. Professors NEEDHAM and JOHANNSEN, and assistants.

This is an elementary course designed to acquaint the general student with the main ideas of biology through selected practical studies of the phenomena on which biological principles are based. Both lectures and laboratory work will deal with such topics as the interdependence of organisms, the simpler organisms, organization and phylogeny, heredity and variation, natural selection and adaptation, segregation and mutation, the life cycle, metamorphosis and regeneration, and the responsive life of organisms. Laboratory fee, $2.50 a term.

Introductory Entomology

1. See Biology, course **1.**

2. **The Ecology of Insects.** Third term, credit three hours. One lecture and two practical exercises, largely field work. Lectures, W, 8. Roberts Hall 392. Practical exercises, one W, 10–12.30, and one by appointment. Professor NEEDHAM and Mr. LOBDELL.

A general course in the study of the lives of insects in relation to their environment. Practical studies will be made of the activities of insects and of the rôle that they play in different natural associations. Observations will be made on the relations between their structures and instincts and the situations in which they live, and on many of the ways in which they find a living and establish homes.

3. **General Entomology.** First, second, and third terms; work of the first term repeated third term, credit three hours a term. Prerequisite course 1 or Zoology 1. First and second terms: Lectures, W F, 9. Dairy Building 222. Professor HERRICK. Practical exercises, M, W, Th, or F, 2–4.30, or S, 8–10.30. Roberts Hall 392. Professor HERRICK, and Messrs. WOODS, SMITH, and BAERG. Third term: Lectures, M W, 9. Roberts Hall 392. Assistant Professor MATHESON. Practical exercises, W or Th, 2–4.30. Assistant Professor MATHESON and Mr. FROST.

First term, lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species. The practical exercises include a study of the structure of insects and practice in their classification. The lectures only (credit two hours) are taken by those who have had courses 4 and 5. The work of the first term may be taken without registration for the second term. It is repeated in the third term. Laboratory fee, $3.

4. **Elementary Morphology of Insects.** First, second, or third term, credit four hours. First and second terms, Th, 9 or 2; third term, Th, 9; and eleven additional hours by appointment. Roberts Hall 391. Professor W. A. RILEY, Assistant Professor BRADLEY, and Mr. HESS.

An introductory laboratory course required of all students planning to take advanced work in entomology. Includes an introduction to the method of phylogenetic study as illustrated by the wings of insects (formerly included in course 5). Laboratory fee, $3.

Students who wish to take course 5 during the term in which they are taking this course complete course 4 during the first twelve weeks of the term by taking fifteen hours a week.

5. **Elementary Systematic Entomology.** First, second, or third term, credit one or two hours. Prerequisite course 4. First term, W Th F, afternoon,

or S morning. Roberts Hall 301. Assistant Professor BRADLEY and Mr. ———. Second term, one or two laboratory periods by arrangement. Roberts Hall 391. Professor W. A. RILEY and Mr. HESS. Third term, Th F, 10–1. Roberts Hall 301. Assistant Professor BRADLEY and Mr. ———.

Practice in the identification of insects. Laboratory fee, $2 or $3.

The completion of forty-five or ninety hours of work in the laboratory will be required.

This course may most advantageously be taken during the third term, and especially in combination with course 10.

Course 4 and one hour of course 5 are required of all students who plan to take advanced work in entomology. They may both be taken in one term by taking fifteen hours of work a week in the laboratory and thereby completing course 4 during the first twelve weeks of the term.

8. **Elementary Economic Entomology.** First term, two hours, without credit toward graduation. A course designed for special students; not open to regular students. Lectures, T Th, 9. Roberts Hall 392. Assistant Professor MATHESON.

Discussion of insect pests in general, with remedial suggestions. Occasionally the class will be taken to the field in order to observe insect pests at work. Laboratory fee, 50 cents.

Apiculture

9. **General Beekeeping.** Second or third term, credit three hours. Prerequisite course 3. One lecture and two laboratory exercises in the apiary and field. Lectures, W, 10. Roberts Hall 392. Practical exercises, T Th, 2–4.30. A second laboratory section will be arranged for M W, 2–4.30, provided fifteen or more register for the course, in which case the T Th section will be limited to ten persons. Assistant Professor KING.

The course is intended to afford a general and thorough knowledge of the fundamentals of beekeeping. The larger problems which confront the beekeeper can be taken up only in a limited way. Conditions in the apiary will be made to approximate as nearly as possible those with which the modern apiarist has to deal. In so far as possible, each student will be required to put into practice the principles discussed in class and to learn by actual practice the things that are necessary for the proper management of an apiary. It will be the aim to acquaint the student with the various phases of bee culture, such as life history, instincts, and general behavior of bees, their products, the sources of honey, the rôle of bees in cross-pollination, the equipment of the apiary, wintering problems, the diseases of bees, and the rearing of queens. Laboratory fee, $2.

Systematic Entomology

10. **Entomotaxy.** Third term, credit two or three hours. Prerequisite course 4, should be accompanied by course 5. Laboratory and field work, W F, 2–5, and for three-hour students, Th or F, 10–1. Roberts Hall 301. Assistant Professor BRADLEY and Mr. ———.

Methods of collecting insects and of preserving them for study and the cabinet, together with other matters of technique. Practice in the identification of the insects of the local fauna. Two all-day field trips will be required.

A week of field work open to students in this course will be arranged for those who wish it. During the summer of 1916 this will be held August 21–28 in the Adirondack Mountains.

Students who are taking course 5 register for two hours in this course; those who have previously had but one hour of course 5 will register for three hours.

11. **Advanced Systematic Entomology.** First term, credit three or more hours. Prerequisite course 5. Three laboratory periods of three hours each during W Th F afternoons, or S morning. Roberts Hall 301. Assistant Professor BRADLEY and Mr. ———.

A training course in the identification and interpretation of obscure characteristics of insects. One hundred and thirty-five or more hours a term in the laboratory must be accomplished by students registered for this course.

12. **Taxonomy of Insects.** Throughout the year, credit four hours a term. Prerequisite courses 3, 4, 5, 11, 14, and 20, and preferably 10. Lectures, F, 8. Laboratory, F, 10–1, and two other periods of three hours each to be arranged. Professors NEEDHAM, JOHANNSEN, and W. A. RILEY, Assistant Professors BRADLEY and MATHESON, Mr. LLOYD, and cooperating specialists.

This course will continue throughout a number of terms, but the work of each term may be elected independently. The course is intended primarily for graduate students who desire a systematic survey of one or more of the orders of insects.

F. Neuropteroids. Third term. Professors NEEDHAM and BETTEN, and Messrs. LLOYD and NAKAHARA.

G. Hymenoptera. First term. Assistant Professor BRADLEY.

H. Orthoptera, Euplexoptera, and Thysanura. Second term. Professor JOHANNSEN.

I. Coleoptera. Third term. Assistant Professors VAN DYKE, BRADLEY, and MATHESON, and Mr. ———.

[A. Physopoda, Mallophaga, Heteroptera. First term, 1917–18. Professor JOHANNSEN and Assistant Professor BRADLEY.] Not given in 1916–17.

[B. Homoptera. Second term, 1917–18. Professor JOHANNSEN. Special attention will be given to scale insects and plant lice.] Not given in 1916–17.

[C. Myriapoda and Arachnida. Third term, 1917–18.] Not given in 1916–17.

[D. Lepidoptera. First term, 1918–19.] Not given in 1916–17.

[E. Diptera. Second term, 1918–19. Professor JOHANNSEN.] Not given in 1916–17.

13. **Classification of the Coccidæ.** First term, credit two hours. Prerequisite courses 4, 5, and 11. Laboratory work by appointment. Roberts Hall 301. Assistant Professor BRADLEY.

The scale insects are selected as the subject of this course because of their economic importance, but the work of the course is a survey of the whole group without undue emphasis on the economic forms. Practice is given in the preparation of specimens for study. Not given in 1917–18.

14. **Entomological Literature and its Technics.** First term, credit three hours. Prerequisite course 3 or 5 or Zoology 5. Lectures and recitations, M W F, 11. Roberts Hall 392. Assistant Professor BRADLEY.

A study of general entomological literature. Practice in the use of generic and specific indices, and bibliographies, and in the preparation of the latter, the methods of preparing technical papers for publication. The rules of nomenclature, including the formation of scientific names.

This course is of a technical nature, and intended to aid students who intend to specialize in entomology or systematic zoology in their contact with literature.

19. **Research in Systematic Entomology.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 10, 11, 14, 20, and one term of course 12. Laboratory hours by arrangement. Roberts Hall 301. Assistant Professor BRADLEY, and Professors NEEDHAM and JOHANNSEN.

Insect Morphology

20. **Morphology and Development of Insects.** First and second terms, credit two hours a term. Prerequisite courses 3 (first term), 4, and 5. Lectures, T Th, 10. Laboratory work to accompany or follow this course is offered under course 21. Roberts Hall 392. Professor W. A. RILEY.

21. **Histology of Insects.** First or second term, credit three or more hours. Prerequisite courses 3 (first term), 4, 5, and 20. Laboratory open daily except S, 8–5. Roberts Hall 392. Professor W. A. RILEY.

A laboratory course to accompany or follow the first term of course 20. Laboratory fee, $1.50 a credit hour.

27. **German Entomological Reading.** First term, without credit. Open only to advanced students in entomology. W, 7–9 p. m. Roberts Hall 392. Professor W. A. RILEY.

Textbook used, Schröder's Handbuch der Entomologie.

28. **French Entomological Reading.** First term, without credit. Open only to advanced students in entomology or zoology. T, 7–9 p. m. Roberts Hall 392. Miss STRYKE.

29. **Research in Morphology of Insects.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 4, and 5. Laboratory open daily except S, 8–5, S, 8–1. Roberts Hall 391. Professors W. A. RILEY and NEEDHAM.

Special work arranged with reference to the needs and attainments of each student. Laboratory fee, $1.50 a credit hour.

Parasitology and Medical Entomology

30. **Animal Parasites and Parasitism.** First term, credit two hours. Must be preceded or accompanied by Zoology 1. Lectures, T, 8. Roberts Hall 392. Practical exercises: section 1, M, 2–4.30; section 2, T, 2–4.30. Professor W. A. RILEY and Mr. CHANDLER.

A consideration of the origin and biological significance of parasitism, and of the structure, life history, and economic relations of representative animal parasites.

31. **Relations of Insects to Disease.** Second term, credit two hours. Prerequisite first term of course 3 or 30. Lectures, T, 8. Roberts Hall 392. Practical exercises: section 1, M, 2–4.30; section 2, T, 2–4.30. Professor W. A. RILEY and Mr. CHANDLER.

Causation and transmission of disease by insects and other arthropods. Laboratory fee, $2.

32. **Advanced Work in Parasitology.** First and second terms, credit two or more hours a term. Prerequisite courses 30 and 31. Laboratory work and conferences, by appointment. Roberts Hall 391. Professor W. A. RILEY and Mr. CHANDLER.

Special work adapted to the needs of the individual student. Those planning to work along the lines of the relations of insects to disease, or of parasites of insects, should precede or accompany this work by course 21.

Advanced Economic Entomology

40. **Advanced Economic Entomology and Insectary Methods.** Third term, three hours. Open only to graduates. Seminary, T, 2–4.30. Field and laboratory work by appointment. Insectary. Assistant Professor MATHESON.

Economic problems connected with applied entomology will be discussed and reported on, and field observations will be made. Experimental methods in breeding, photographing, investigating, and controlling insects will be discussed and studied. Designed for advanced students in entomology who desire to fit themselves for experiment station work. Laboratory fee, $2.50.

41. **Forest Insects.** Second term, credit two hours. Prerequisite first term of course 3. Lectures, T Th, 11. Roberts Hall 392. Professor HERRICK.

A course of lectures dealing with insects injurious to forest and shade trees, together with a consideration of the best methods of controlling their ravages.

49. **Research in Economic Entomology.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 4, and 5. Laboratory and field work by appointment. Insectary. Professor HERRICK and Assistant Professor MATHESON.

In most cases it is impracticable to complete an investigation in this subject during the college year. Students must arrange to conduct their observations during the growing season.

Limnology

50. **General Limnology.** Second or third term, credit three hours. Open only to students who have taken or are taking courses 1 and 3, or the equivalent. Lectures, Th, 8. Roberts Hall 392. Laboratory, Th, 2–4.30, and one period by appointment. Roberts Hall 492. Professor NEEDHAM and Mr. LLOYD.

An introduction to the study of the life of inland waters. Aquatic organisms in their qualitative, quantitative, seasonal, and ecological relations. Laboratory fee, $2.50.

51. **Aquiculture.** Second term, credit two hours. Lectures, M W, 12. Roberts Hall 392. Assistant Professor EMBODY.

A course on the conservation and utilization of the resources of inland waters. A visit to one of the state fish hatcheries and a report on its operations is required. The expense of this trip will not exceed five dollars.

52. **Fish Culture.** Second term, credit one or two hours. Must be preceded or accompanied by course 51. W F, 2–5. Biological Field Station and Experimental Hatching Station. Assistant Professor EMBODY.

A laboratory course designed to give acquaintance with the fresh-water food and game fishes, the natural conditions in which they live, and methods for their propagation. Laboratory fee, $2.50.

53. **Plancton.** Second and third terms, credit one hour a term. Prerequisite permission to register. Laboratory, F, 2–4.30. Roberts Hall 492. Professor NEEDHAM and Mr. LLOYD.

A laboratory and field course designed to give acquaintance with the genera of microscopic organisms of the region. Laboratory fee, $1.50.

58. **Research in Aquiculture.** Throughout the year, credit three or more hours a term. Prerequisite courses 50 and 51. Laboratory and field work by appointment. Assistant Professor EMBODY.

59. **Research in Limnology.** Throughout the year, credit three or more hours a term. Prerequisite course 50 or its equivalent. Laboratory and field work by appointment. Roberts Hall 492 and Biological Field Station. Professors NEEDHAM and W. A. RILEY, and Assistant Professor EMBODY.

Nature Study

61. **Nature Study.** First and second terms, credit three hours a term. Lectures, W, 12. Insectary. Practical exercises in two sections, T Th, 11–1, or T Th, 2–4.30. Insectary. Assistant Professor COMSTOCK.

This course gives laboratory and field practice with those subjects in plant and animal life that are best fitted for nature study in the elementary schools. Special attention is given to methods of study and manner of presentation, and also to the relation of the topics to agriculture. The work consists of conferences, field practice, and laboratory practice. The lectures discuss nature study as a part of elementary education, and methods of correlating nature study with other school work.

62. **Nature Study, Advanced Course.** First and second terms, credit two hours a term. Prerequisite courses 1 and 61. Lectures, hour to be arranged. Laboratory, M, 2–4.30. Insectary. Assistant Professor COMSTOCK.

Field and laboratory work, and the study of nature literature.

65. **Conference on Nature Study.** First term, credit one hour. W, 11. Insectary. Open only to teachers or prospective teachers of nature study. Assistant Professor COMSTOCK.

Informal discussion of the relations of nature study to life, to science, to agriculture, and to the public schools.

Seminaries

Seminary. Throughout the year. M, 4.30–5.30. Roberts Hall 392.

The work of an entomological seminary is conducted by the Jugatæ, an entomological club which meets for the discussion of the results of investigations by its members.

79. **Journal Club.** First and second terms. Th, 4.30. Roberts Hall 392. Professors NEEDHAM, W. A. RILEY, and HERRICK, and Assistant Professor BRADLEY.

Reviews and discussions of current literature relating to the work of the Department. Required of graduate students.

Summer Field Trip. A summer field trip will be held August 21–28, 1916, in the Adirondack Mountains. This trip is designed primarily for students in entomotaxy (course 10) but will be open by permission to all graduates and properly qualified undergraduates in the Department who can make satisfactory arrangements for the carrying forward of their regular work.

Ornithology

6. **Field Ornithology.** Second term, credit three hours. Lectures, W, 11. McGraw Hall 5. Field work and laboratory, M W, 2–4.30, or T Th, 2–4.30. Assistant Professor ALLEN and Mr. HUBBARD.

This course is intended primarily for students wishing to gain a knowledge of local birds, their habits, songs, nests, and eggs, their relation to agriculture, and the general principles of their conservation. Studies of the ecological groups of birds and of the life histories of common species will be made emphasizing the adaptations of habit and structure to environment. Field work will be supplemented by laboratory studies, and, after the first of May, field trips will be held at 5.30 a. m. Laboratory fee, $2.

9. **Advanced Ornithology.** First term, credit three hours. Prerequisite course 5 and Vertebrate Zoology. Lectures, W, 11. McGraw Hall 5. Laboratory and field work, T Th, 2–4.30. Assistant Professor ALLEN.

A consideration of the birds of the world. The lectures will take up the structure and classification of birds; the origin and evolution of fossil and living groups; geographical distribution; the literature and institutions of ornithology. Laboratory periods will be devoted to the identification of skins of native and foreign representatives of the different families of birds. The first part of the term will be devoted to field work on the fall migration, and the identification of birds in winter plumage. Laboratory fee, $2.

[11. **Economic Ornithology and Mammalogy.** First term, credit three hours. Should be preceded by course 6 or Zoology 5; presupposes an elementary knowledge of botany and entomology. Lectures, W, 11. McGraw Hall 5. Laboratory and field work, T Th, 2–4.30. Assistant Professor ALLEN. Given in alternate years with course 9.] Not given in 1916–17.

This course is designed to assist those planning professional work with birds or mammals. The lectures will take up the various phases of bird and mammal life in relation to agriculture with the methods of increasing beneficial species and destroying vermin; together with the elements of game breeding and fur farming. The laboratory will give practice in the identification of the food of birds, the preparation of material, and the making of skins. The field work will give opportunity for observation of feeding habits, field collecting, methods of attracting birds, and natural history photography.

EXTENSION TEACHING

1. **Extension Work.** First term, credit two hours. Open to juniors and seniors, and to others by arrangement. Public Speaking 1 should precede this course. The number in each section will be limited; students will consult Professor EVERETT for assignment to sections. Lectures and practice, M W, 9, Agronomy Building 192; M F, 11, W F, 10, or T Th, 10, Roberts Hall 131;

T Th, 12, Dairy Building 222. Criticism by appointment, daily, 8–1. Roberts Hall 131. Professor EVERETT, Assistant Professors WHEELER and GILKEY, and Messrs. WHITNEY, SHAPER, PHIPPS, and HATCH.

Lectures and discussions on problems of university extension in agriculture. Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to acquaint students with parliamentary practice, to encourage interest in public affairs, and, through demonstrations and the use of graphic material and other forms, to train for effective self-expression in public. Special training will be given to competitors for the Eastman Prize for Public Speaking. (See page 20.) A few juniors and seniors will be sent out into the State to address meetings.

2. **Extension Work.** Second term, credit two hours, or three hours by arrangement. Prerequisite course 1, of which course 2 is a continuation. Lectures and practice, W F, 10, M F, 11, or T Th, 10 or 12. Roberts Hall 131. Criticism by appointment, daily, 8–1. Professor EVERETT, Assistant Professors WHEELER and GILKEY, and Messrs. WHITNEY, SHAPER, PHIPPS, and HATCH.

3. **Extension Work, Advanced Course.** First term, credit one hour. Prerequisite courses 1 and 2, or the equivalent. F, 9. Roberts Hall 131. Professors TUCK and EVERETT, Assistant Professor WHEELER, and Mr. WHITNEY.

The course will take up advanced study of subject matter and administrative problems in extension. Students will be given opportunity to gain experience in addressing meetings whenever it can be arranged. The number of students will be limited.

THE FARM

1. **The Farm.** First or second term, credit two hours. Field work and recitations: First term, by assignment; one recitation and one practice period a week. Second term: section 1, F, 9, M, 8–10.30; section 2, T, 8, T, 2–4.30; section 3, W, 8, Th, 8–10.30; section 4, W, 10, F, 2–4.30; section 5, Th, 10, S, 8–10.30. Professor NEEDHAM, Assistant Professor EMBODY, Mr. ALEXANDER, and assistants.

This is a course in the study of agricultural environment. The university farm is visited. Its topography, its population, and its chief crops, wild and cultivated, are studied. Its fields, hills, woods, and streams are explored, and records are made of the things observed.

The course deals with the sources of agriculture. It considers crops from the naturalist's viewpoint—Nature's cereals and fruits and roots and fowls that were all present before agriculture developed. Wild products are compared with cultivated varieties, and the related forms that have not been brought into cultivation are not overlooked. Finally, these things are viewed collectively, as conditioning the human affairs of the country community. They are considered as elements that may be contributory to the beauty, the healthfulness, and the intellectual interest and enjoyment of the farm home. Fee, $2.

FARM CROPS

1. **Cereals, Forage Crops, and Miscellaneous Crops.** First or second term, credit four hours. To be preceded or accompanied by Soils 1 or 2 and Botany 1. Lectures, M W F, 10. Roberts Hall 292. Laboratory, M, T, or W, 2–4.30. Students must consult the Department regarding laboratory appointments. Agronomy Building 202. Mr. DYNES.

The history, culture, uses, and distribution of the principal farm crops. Laboratory study of the principal types and varieties. Laboratory fee, $2.

2. **Farm Crops, Advanced Course.** First or third term, credit three hours. Prerequisite course 1. Lectures, M W F, 8. Agronomy Building 192. Professor MONTGOMERY.

The object of this course is to study the more important principles of crop production, based on experimental evidence. Both cereal and forage crops are studied. An effort is made to acquaint the student with the best sources of

literature, especially the work of experiment stations. About six hours per week reference reading is required.

4. **Special Cash Crops.** First or second term, credit three hours. To be preceded or accompanied by course 1 and Botany 1. Lectures, T Th, 11. Agronomy Building 192. Laboratory: first term, Th, 2–4.30; second term, Th or F, 2–4.30. Agronomy Building 202. Mr. HARDENBURG.

This course is designed to make a special study of those crops that are grown in New York State largely as cash crops for the wholesale market, such as potatoes, field beans, and cabbage. Lectures and laboratories consider history, economic importance, classification, all cultural phases, marketing, and uses of the crops under discussion. Laboratory fee, $2.

5. **Seminary.** First term, without credit toward graduation. Required of graduate students. M, 4.45. Agronomy Building 92. Professor MONTGOMERY.

6. **Research.** Throughout the year, two or more hours a term. Prerequisite permission to register. The student will usually be required to remain during one third term in order to work out experimental problems. Limited to graduate students. Professor MONTGOMERY.

FARM MANAGEMENT

1. **Cost Accounting.** First term, credit two hours. Open to juniors and seniors who have passed the farm practice examination. Should precede course 2. Lectures, T, 8. Dairy Building 222. One laboratory period per week; students must report to the Department for assignment to laboratory sections. Assistant Professor THOMPSON and Mr. HARVEY.

Farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm. Two one-half day field trips will be taken, one about October 1 and the other about December 1. On these days the laboratory period will be from twelve o'clock to seven o'clock. Laboratory fee, $1.

2. **Farm Management.** Second or third term, credit four hours. Open to juniors and seniors who have passed the farm practice examination. This course is designed for students who have had considerable farm experience. It should be taken near the end of the student's college course, and should be preceded or accompanied by course 1, economics, and as many as possible of the subjects dealing with the production of crops and animals. Lectures, M W F, 10. Dairy Building 222. One laboratory period per week. Students must report to the Department for assignment to laboratory sections. On days when farms are visited, laboratory work may last longer than two and one-half hours. Second term, Professor LIVERMORE and Mr. MISNER; third term, Assistant Professor THOMPSON.

Lectures, recitations, and laboratory practice. Farming as a business; labor income; size, diversity, and production of business; regions and types of farming; cropping systems; farm layout; building arrangement; efficient use of labor, horses, and machinery; marketing; forms of tenure and leases; organization and management of successful farms; ways of starting farming; use of capital and credit; choosing and buying a farm; planning, organization, and management of specific farms. One-day excursions will be made, about May 15 and September 5, to farms at some distances from Ithaca. Laboratory fee, $2.

Advanced and Graduate Courses

3. **Farm Organization.** First term, credit two hours. Prerequisite permission to register, and courses 1 and 2. No undergraduate will be admitted to this course who has not made an unusually good record in courses 1 and 2. Application for admission to the course should be made several days before registration. M, W, or F, 2–5. Farm Management Building 101. On days when

field trips are taken, the class will in some cases leave on a noon train and return on an evening train. Professor LIVERMORE and Mr. MISNER.

Field trips for studying farms and regions. Discussions of organization and management of farms visited. Some time will be devoted to other problems in farm management. There will be two one-day field trips or one two-day field trip for each section in October or November. Expenses for trips are estimated to be about $15.

4. **Types of Farming in the United States.** Second term, credit two hours. Prerequisite permission to register and course 3. No undergraduates will be admitted to this course who have not made an unusually good record in course 3. Laboratory, Th, 2–4.30. Farm Management Building 101. Professor WARREN.

A study of the types and methods of farming best adapted to different sections of the United States, and of the natural and economic conditions that make these types best.

5. **Seminar.** Second term, credit one hour a term. Open to graduate students and to others by special permission. T, 4.45–6. Farm Management Building 101. Professor LIVERMORE.

Problems, reading, discussions, and talks by outside speakers, on subjects relating to farm management.

6. **Agricultural Statistics.** First term, credit two hours. Must be preceded or accompanied by course 3. Th, 2–4.30. Farm Management Building 102. Professor WARREN.

A study of the principles involved in the collection, tabulation, and interpretation of agricultural statistics. This course is designed for students who expect to do research work in farm management or in other agricultural statistics.

7. **Research.** Throughout the year, credit one or more hours a term. Prerequisite permission to register. Only those students who can present an acceptable plan for an investigation will be admitted. Hours by appointment. First and second terms, Professors WARREN and LIVERMORE; third term, Assistant Professor THOMPSON.

Special investigations of problems in farm management.

FARM PRACTICE

1. **Farm Practice.** First, second, or third term, without credit toward graduation. Hour and place by appointment. Professor KING and Mr. MOULTON.

An elective course designed to assist students in meeting the requirements in farm practice demanded by the College. In order to meet these requirements students must have a practical knowledge of horses, cattle, sheep, swine, poultry, crops, farm machinery, orcharding, gardening, butter and cheese making, and the like. All men students must satisfy the farm practice requirement before the beginning of the senior year and must report to the Department of Farm Practice within three weeks after their first registration in the College. Exemption from these requirements is allowed only to students specializing in the Departments of Botany, Home Economics, Forestry, Entomology, or Landscape Art; application for such exemption must be made at the office of the Secretary. The Department of Forestry requires three months of forestry practice in lieu of the farm practice requirement.

FLORICULTURE

Instruction in floriculture is planned for the following classes of students: (1) those who intend to make some branch of commercial flower growing their life work; (2) those who plan to enter a retail business; (3) those who are interested in amateur flower growing for pleasure and for home decoration; (4) those who plan to take up some line of work on private estates or in city parks. With this object in mind, courses have been outlined which give students a thorough knowledge and training in some one or in several of these features. While course 1

is open to freshmen, it is advised that students who have had no training in botany delay taking this course until their second year. Courses 3 and 4 should not be elected until courses in botany, soils, plant physiology, plant pathology, plant breeding, and economic entomology have been taken. A broad foundation is thus laid on which to build the scientific and technical principles of flower growing.

1. **Principles and Methods of Greenhouse Practice.** First term, credit three hours. Lectures, T Th, 11. Floriculture Building. Practice, M or W, 2–4.30. Greenhouses. Professor WHITE, Mr. THAYER, and Miss MINNS.

A course intended to acquaint students with general greenhouse methods and the scientific principles governing the same. This is an elementary course in flower growing. Laboratory fee, $2.

2. **Greenhouse Construction.** Second term, credit three hours. Lectures, M, 11. Practice, W F, 2–4.30. Floriculture Building. Assistant Professor LUMSDEN and Mr. VOLZ.

The evolution of the greenhouse, present-day types, materials and methods of construction, principles and methods of heating. Laboratory practice consists in making detailed drawings and blue prints of greenhouse material, drawing plans for commercial and private ranges, and preparing specifications of the same, with estimates of cost of construction. Practical exercises in concrete bench construction, glazing, and other construction problems will be given as facilities allow. Laboratory fee, $1.

3. **Commercial Floriculture.** Second or third term, credit four hours. Prerequisite courses 1 and 2, Botany 1 and 8, and Soils 1. Lectures and recitations, M W F, 10. Floriculture Building. Practice, M, 2–4.30. Greenhouses. Professor WHITE and Assistant Professor LUMSDEN.

Studies in the propagation and culture of florists' crops. As far as possible, practical work will be given in the propagation and culture of roses, carnations, violets, orchids, and other plants grown for commercial purposes. Methods of packing, shipping, and marketing will be considered. Laboratory fee, $2.

4. **Commercial Floriculture.** First term, credit four hours. Prerequisite course 3. Lectures and recitations, M W F, 10. Floriculture Building. Practice, F, 2–4.30. Greenhouses. Professor WHITE.

A continuation of course 3, with methods of propagation and culture of those commercial crops not previously considered. These courses, with their prerequisites, aim to fit students for commercial work. Students taking these courses are advised to work during vacations on commercial ranges. The class will participate in a required excursion to Syracuse on November 10 and 11. Laboratory fee, $2.

5. **Greenhouses and Garden Practice.** Throughout the year, credit two or four hours a term. Prerequisite course 1 and permission to register. Practice by appointment, but the hours must cover one-half or one whole day. Greenhouses and gardens. Mr. VOLZ and greenhouse assistants.

Designed to give students a wider experience in the practice of flower growing. The course consists of practice work in all branches of greenhouse management. Reports of work done are required.

6. **Floral Arrangement.** Second term, credit one hour. Registration is limited to fifteen. Lectures, demonstrations, and practice. S, 8–10.30. Greenhouses. Professor WHITE and Miss MINNS.

A study of the principles and methods of arrangement of flowers for home decoration and table decoration, in baskets, vases, and formal designs; also the arrangement of flowers and plants for all types of interior decoration. Laboratory fee, $3.50.

7. **Conservatory Plants.** Second or third term, credit two hours. Prerequisite course 1. Lectures and demonstrations, T Th, 11. Floriculture Building. Assistant Professor LUMSDEN.

Designed for students interested in work on private estates or in parks. This course should be preceded or accompanied by courses 2 and 3. A study of

such tropical and subtropical foliage and flowering plants as are used for the ornamentation of glasshouses of decorative type. Laboratory fee, $1.

8. **Garden Flowers.** Second and third terms, credit three hours a term. Prerequisite Botany 1; Botany 8 recommended. Lectures, T Th, 9. Floriculture Building. Practice, T or Th, 2–4.30. Greenhouses and gardens. Assistant Professor LUMSDEN and Miss MINNS.

A study of the identification, propagation, and culture of annuals, herbaceous perennials, and roses. The aim is to give the student an intimate knowledge of those forms of annual and herbaceous plants that may be used in garden planting either on home grounds or in public parks. An excellent collection of plant material is available for demonstration work in this course. All members of the class will be required to participate in an excursion to the Thompson estate at Canandaigua on May 27 and August 12. Laboratory fee, $2.

8a. **Grouping and Arrangement of Annuals and Herbaceous Perennials.** Second and third terms, credit two hours a term. Prerequisite course 8. Lectures, S, 9. Practice, S, 10.30–1. Assistant Professor LUMSDEN.

A study of the principles and methods of arrangement of garden flowers in the border and flower garden. The planting of borders for a continuous display of bloom throughout the season. Æsthetic taste in color arrangement will also be studied. Laboratory fee, $2 a term.

9. **Amateur Floriculture.** First, second, or third term, credit three hours a term. Lectures, W and F, 11. Floriculture Building. Practice: first term, S, 10.30–1; second term, W, 2–4.30. Greenhouses. Miss MINNS.

The propagation and culture of potted plants in the home—plants suitable for window gardening and for outdoor home gardening. The course includes a study of containers, soils, fertilizers, and insecticides; also the preparation and planting of flower beds. It is planned primarily for students who are interested especially in home economics, but is open to any one desiring information regarding simple methods of plant culture. Laboratory fee, $2 a term.

11. **The History and Literature of Floriculture.** Second term, credit two hours. Lectures, M W, 11. Floriculture Building. Designed primarily for seniors and graduate students. Professor BEAL.

A comprehensive study of the evolution of gardening, the introduction of plant material, and the development of floricultural ideals. These are traced, beginning with the earliest records, through the centuries to the present time. The unusually large library collection of herbals and European works of later date offers exceptional facilities for presenting this course.

12. **Investigation in Floriculture.** Throughout the year, credit one, two, or three hours a term. Prerequisite courses 1, 3, and 4, and permission to register. Designed primarily for upperclassmen and graduate students. Consultation by appointment. Professors WHITE and BEAL, and Assistant Professor LUMSDEN.

The investigation of problems in growing flowers for cutting, exotics, garden flowers, and the like.

13. **Seminary.** Throughout the year, one hour a term. Required of advanced students who elect course 12, and of all graduate students. Th, 4.45–5.45. Floriculture Building. Professor WHITE and members of the staff.

FORESTRY

The Department of Forestry has three principal aims: to give instruction at the University; to conduct research; and to give direct help to the owners of forest lands in New York State.

An important part of the work of the Department is its effort to be of direct help to owners of forest lands in New York State. This is accomplished by correspondence, publications, lectures, personal inspection of woodland or of land to be planted to forest, and cooperative care of forest lands.

The instruction in forestry is designed to meet the needs of several classes of students: (1) students of general agriculture who wish elementary instruction

in the care of woodlands and in forest planting and forest nursery work; (2) prospective teachers, business men, lawyers, and others who desire an understanding of the place of forestry in the life of a nation; (3) technical students in other lines who wish one or more technical forestry courses, such as wood technology; (4) professional forestry students, preparing for forestry as a life work.

The courses offered are designed not only to prepare students for a professional career in general forestry, but also to provide opportunity for advanced study and research in silviculture, forest management, forest mensuration, forest entomology, forest pathology, and other lines in which specialists will be useful.

Adequate preparation for the profession of forestry requires at least a year of graduate study in addition to the four year undergraduate course. The undergraduate work in forestry leads to the degree of bachelor of science; the graduate work leads to the degree of master in forestry.

Part of the work, both in the senior and in the graduate year, is given in the third (summer) term. The last ten weeks in the third term are spent in camp in the Adirondacks, or in some other large forest in New York State. The entrance requirements are the same as for general agriculture.

During the four years the student is registered in the College of Agriculture his work must include: (a) all the courses required of general agricultural students; (b) solid geometry and plane trigonometry, unless accepted for entrance; (c) such other courses as the Department of Forestry believes to be best adapted to meet the needs of the individual student; and (d) at least three months experience in forestry work or in a logging camp, in lieu of the farm practice requirement. On page 49 is a recommended sequence of studies that will prove desirable for most students specializing in this field, but at the discretion of the Department deviations from it will be made for students entering the course with advanced standing, and for other students when advisable. In all cases the course of study for a professional forestry student must be planned by the Department of Forestry; and the faculty has ruled that each professional forestry student must choose as his faculty adviser one of the professors or assistant professors in the Department of Forestry. Admission to candidacy for the degree of master in forestry may be conditioned on compliance with this regulation. Freshmen who are planning to take the professional forestry course are urged to consult the Department of Forestry at the beginning of the college year.

In the year in the Graduate School, the student registers for one major and one minor subject, and pursues either advanced study or research along these lines. This year is not devoted to undergraduate class work taken by graduate students, although in special cases a part of the student's time may be spent in such work.

Persons who have already attended some college or university and desire to enter with advanced standing may register in the Graduate School as candidates for the degree of master in forestry, if the following requirements have been fulfilled: (1) The candidate's training must be accepted as substantially equivalent to the first four years of the professional forestry course given at Cornell University. (2) The candidate must have had at least three months experience in forestry work or in a logging camp, proof of which is to be by a signed statement or by an examination in woodsmanship, or by both.

A student entering the Graduate School as a candidate for the degree of master in forestry should enter at the beginning of the third (summer) term. Otherwise it will be difficult to arrange his work satisfactorily. Students who enter as graduates without having had undergraduate instruction in forestry should be able to complete the work for the master's degree in two years if they have had substantially the equivalent of most of the courses, other than forestry, listed in the sequence of courses on page 49; if they lack much of the fundamental science work there listed, a correspondingly longer time will be required for such students to qualify for the master's degree. Work for the degree of doctor of philosophy may also be done in forestry.

Further details regarding the professional course may be obtained through correspondence with the Department of Forestry. All new students who plan to specialize in forestry are urged to communicate with the Department. Profes-

sional students must register with the Department in order that their standing as such may be recognized.

Recommended sequence of studies for professional students in forestry

The subjects in black-faced type are required of all students in the College of Agriculture. The subjects given in the freshman year which are not in black-faced type must be taken by all freshmen who plan to take the professional forestry course; the failure of a student to do this will complicate the remainder of his course.

Freshman year

	Hours 1st term		Hours 2d term
English 1	4	**English 1**	4
Chemistry 1	6	**Chemistry 85**	4
Biology 1	3	**Biology 1**	3
The Farm 1	2	Drawing 1	3
Mathematics 1*	3	Mathematics 3*	3

Sophomore year

	Hours 1st term		Hours 2d term
Botany 1	6	**Physics 2**	5
Geology 1	3	**Botany 20 (General Plant Physiology)**	4
Geology 11†	3	Geology 15†	1
Civil Engineering 10 (Elementary Surveying)†	3	Civil Engineering 11a (Advanced Surveying)†	4
Entomology 3	3	Entomology 41	2
		Sibley S4 (Forge Work)†	1

Summer following sophomore year

Summer camp for five weeks, beginning in June. Civil Engineering 13 (Surveying), six hours credit.

Junior year

Hours 1st term		Hours 2d term		Hours 3d term	
Political Science 51	3	**Political Science 51**	3	Forestry 9	4
Forestry 8	3	Forestry 6	2	Forestry 11	5
Zoology 5†	3	Forestry 13	3	Forestry 14	3
Plant Pathology 1	3	Plant Pathology 2	2	Forestry 15	3
Botany 2	3	Zoology 5†	3		
Civil Engineering 14a (Surveying)†	1	Soil Technology 1	3		
		Civil Engineering 14a (Surveying)†	1		

NOTE: The cost of the forestry camp in the third term should not exceed $55 for board and about $15 for railroad fare. Tents and beds are provided, but students must furnish their own bedding and field clothing.

Senior year

1st term	Hours 2d term	
Three months practical work in the forest	Forestry 10	2
	Forestry 16	3
	Forestry 18	1
	Forestry 19	3
	Entomology 51	2
	Landscape Art 2	1
	Rural Engineering 3	3

The remaining work of the undergraduate years should be chosen with reference to the tastes and needs of the individual student.

*If Mathematics 1 (solid geometry) has been offered for entrance, Mathematics 3 (plane trigonometry) should be taken in the first term, and Meteorology 1 should then be taken in the second term. If not taken in the freshman year, meteorology should be taken later if possible.

†Courses so indicated are given in other colleges than Agriculture and are charged against the allowed twenty hours of nonagricultural electives (see page 24).

Graduate year

Third, or summer, term	First, or autumn, term
Forestry 20 (Forest Management)	Forestry 21 (Forest Administration)
Forestry 22 (Seminary)	Forestry 22 (Seminary)
Forestry 23 (Advanced Work)	Forestry 23 (Advanced Work)
Forestry 24 (Research)	Forestry 24 (Research)

Courses intended primarily for students who do not expect to make forestry their major work. Standing as professional forestry students may not be gained by taking courses 1-5

1. **The Farm Woodlot.** First or second term, credit two hours. Lecture, M, 9. Forestry Building 122. Practice, M or T, 2–4.30. Forestry Building 8. First term, Assistant Professor COLLINGWOOD; second term, Mr. GUISE.

The management of the farm woodlot, and the starting of new woodlots by planting or sowing. A course dealing with the woodlot as deserving and repaying proper care, such as is given other crops on the farm. Laboratory fee, 50 cents.

Students expecting to take courses 2 and 3 should not elect course 1, as the ground covered in course 1 is repeated in courses 2 and 3.

2. **Elements of Forestry: Mensuration, and Management.** Second term, credit three hours. Lectures, T Th, 9. Forestry Building 122. Practice, T or W, 2–4.30. Forestry Building 118. Assistant Professor BENTLEY.

An elementary course including estimating and measuring the amount of standing timber and its value; measurement of logs and other forest products; rate of growth of timber in diameter, height, volume, and value; age at which timber should be harvested; methods of regulating the amount of timber cut so as to insure a permanent income. (See course 3.) Laboratory fee, $1.

3. **Elements of Forestry: Silviculture.** First term, credit three hours. Lectures, T Th, 9. Forestry Building 122. Practice, W or Th, 2–4.30. Forestry Building 118. Professor HOSMER.

An elementary course including the life history of the forest; the influence of soil and climate on forests; the influence of forests on stream flow, climate, and soil; forest planting, sowing, and nursery work; reproducing the forest without planting or sowing; care of the crop during its growth, including thinning; protection from fire and other enemies; identification of a few of the principal timber trees of this region. (See course 2.) Laboratory fee, $1.

Courses 2 and 3 may be taken independently. If both courses are taken, they should meet the needs of students who wish a more detailed knowledge of timberland management than is given in course 1, but do not wish the professional courses.

4. **Elements of Forestry: Forest Utilization.** First term, credit two hours. Lectures, M W, 10. Forestry Building 122. Professor RECKNAGEL.

The principal industrial uses of timber; logging methods and equipment; logging in representative regions; manufacture of lumber; determination of stumpage values; minor industries; utilization of forest products other than wood, as grazing range, fish and game, and the like.

5. **Conservation of Natural Resources.** First term, credit two hours. Lectures, T Th, 10. Forestry Building 122. Professor ADAMS.

The conservation of natural resources in the United States; the interrelation of the uses and wastes of the forests with those of various resources. The influence of the physical equipment of America on human life and on American civilization.

Courses intended both for professional forestry students and for students in other lines

6. **The Field of Forestry.** Second term, credit two hours. Lectures, M W, 10. Forestry Building 122. Professor SPRING.

The place of forestry in the life of a nation; its aims and importance; national, state, communal, and private forestry enterprises; the day's work of a forester.

8. **Wood Technology.** First term, credit three hours. Lectures, W F, 11. Forestry Building 122. Practice: professional forestry students, F, 2–4.30; other students, Th, 2–4.30. Forestry Building 8. Professor RECKNAGEL.

Structure of wood; physical, chemical, and mechanical properties of wood; technical uses of wood (paper pulp, destructive distillates, and the like); wood conditioning (drying and seasoning); wood preservation; identification, qualities, and uses of the wood of important trees. Laboratory fee, $1.

NOTE: The first ten weeks of the course cover everything up to wood preservation, which occupies the remaining five weeks. Those students who desire to omit wood preservation should register for two hours; those who desire only wood preservation should register for one hour and enter the course for the last five weeks. Professional forestry students are required to take the complete course.

Courses intended primarily for professional forestry students

Professional forestry students should not elect courses 1, 2, 3, and 4, as the following required professional courses cover the same ground in greater detail.

9. **Forest Utilization.** Third term, credit four hours. First six weeks in Ithaca; remainder of term in camp on a forest tract. Lectures, M T W Th F, 11. Forestry Building 122. In camp: lectures, M Th, 8; field work, all day W, for four weeks. Professor RECKNAGEL.

The principal industrial uses of timber; logging methods and equipment; logging in representative regions; manufacture of lumber; determination of stumpage values; timber sale contracts; timber sale administration, including marking, brush disposal, and scaling in practice; minor industries; utilization of forest products other than wood, as grazing range, fish and game, and the like.

10. **Forest Engineering.** Second term, credit two hours. Prerequisite plane trigonometry and one course in surveying. Lectures, T Th, 11. Forestry Building 126. Assistant Professor BENTLEY.

The construction of trails, roads, telephone lines, and the like. Field work in forest engineering is given in camp on a forest tract in the third term, in connection with Forestry 23.

11. **Forest Mensuration.** Third term, credit five hours. First six weeks in Ithaca; remainder of the term in camp on a forest tract. Lectures, M T W, 8. Forestry Building 126. Practice, M, 2–4.30. Forestry Building 118. In camp: lectures, M Th, 9; practice, all day F. Assistant Professor BENTLEY.

Measurement of logs and standing timber; timber cruising; study of the rate of growth of timber; volume and yield tables. Laboratory fee, $1.50.

13. **Timber Trees and Forest Regions.** Second term, credit three hours. Lectures, M W, 12. Forestry Building 122. Practice, F, 2–4.30. Forestry Building 118. Assistant Professor BENTLEY.

A brief account of the forest regions of the world; detailed description of the forest regions of the United States and Canada; the distribution, importance, and silvical characteristics of a large number of the leading timber trees of the United States and Canada, and the identification of such of these as do not grow near Ithaca. (The identification of trees growing near Ithaca is included in Botany 2.) Laboratory fee, $1.

14. **Silviculture: Forest Ecology.** Third term, credit three hours. Prerequisite Botany 1 or its equivalent. Lectures, M T W Th F, 10. Forestry Building 122. Practice, W, 2–4.30, S, 8–1. Forestry Building 118. Professor SPRING.

The influence of site on the forest and of the forest on site; the behavior of trees as members of a forest community. Laboratory fee, 50 cents.

15. **Silviculture: Natural Reproduction and Care of the Forest.** Third term, credit three hours. Prerequisite courses 13 and 14. In camp on a forest tract. Lectures, M T Th S, 11. Practice, all day W, for five weeks. Professor SPRING.

A technical discussion of the silvicultural systems as practiced in Europe, and the possibility of using them in each of the forest regions of the United States and Canada; improvement cuttings, thinnings, and underplanting; marking timber for cutting.

16. **Silviculture: Forest Planting and the Forest Nursery.** Second term, credit three hours. Lectures, W, 9. Forestry Building 122. Practice, S, 8–1. Forestry Building 118. Professor SPRING.

Collection, care, and testing of tree seeds; identification of tree seeds and seedlings; raising trees in a forest nursery; starting forests by planting trees and by direct seeding; fixation of sand dunes; forestation on the prairies and under semi-arid conditions; great forestation enterprises of the world. Laboratory fee, $1.50.

18. **Forest Protection.** Second term, credit one hour. Open only to professional forestry students. Lectures, F, 9. Forestry Building 122. Professor HOSMER.

Protection of forests from fire and other enemies. Protection from injury by insects and fungi is given in Entomology 41 and Plant Pathology 1 and 2, respectively.

19. **Forest Policy, Forest Law, and History of Forestry.** Second term, credit three hours. Lectures, M W F, 11. Forestry Building 122. Professor HOSMER.

The historical development and present status of the relations of the state and the individual to forestry; the elements of forest law, including forest taxation.

Course 19 should not be elected by others than professional forestry students, unless they have had courses 2 and 3, or course 6.

20. **Forest Management.** Third term, five hours. Open only to graduate students. First six weeks in Ithaca; remainder of the term in camp on a forest tract. Lectures, daily, 9. Forestry Building 126. In camp: lectures, M, 10, S, 8 and 10. Practice, all day T W F. Professor RECKNAGEL and Mr. GUISE.

Forest organization, including foundations of working plans, regulation of yields, and the formulating of working plans; forest finance, including forest valuation (the ascertainment of values) and forest statics (the comparison of values).

21. **Forest Administration.** First term, credit two hours. Prerequisite course 20. Lectures, M Th, 9. Forestry Building 126. Practice, S, 9–11.30. Forestry Building 126. Professor RECKNAGEL.

Personnel and organization, exemplified by various actual organizations; business practice. Field work in forest administration is given in camp on a forest tract in the third term, in connection with course 20.

22. **Seminary.** First and third terms, two hours a term. Open only to graduate students. Hours to be arranged. Forestry Building 126. Professors HOSMER, SPRING, and RECKNAGEL, Assistant Professor BENTLEY, and Mr. GUISE.

23. **Advanced Work.** Throughout the year, credit two or more hours a term. Open to undergraduate and graduate students who have had the necessary training. Hours by appointment. Professors HOSMER, SPRING, and RECKNAGEL, Assistant Professor BENTLEY, and Mr. GUISE.

Individual advanced study of designated topics. All graduate students taking course 23, except those who are specializing in lines not requiring a field trip, will be given working-plan and other forestry work on a large forest tract during the third term. The field work will be in charge of Professor RECKNAGEL and Assistant Professor BENTLEY.

24. **Research.** Throughout the year, three or more hours a term. Open only to graduate students who have had the necessary training. Hours by appointment. Professors HOSMER, SPRING, and RECKNAGEL, Assistant Professor BENTLEY, and Mr. GUISE.

HOME ECONOMICS

A four year course in home economics has been organized for students who desire to specialize in this work. The schedule of work for the first two years follows closely the outline given on pages 24–25. The following changes, however, are made for students in home economics; they are not required to take geology; food chemistry is substituted for agricultural chemistry and must be preceded by organic chemistry; human physiology is required in place of plant physiology or physiology of domestic animals; Zoology 1 is recommended in place of Botany 1. The last two years permit specialization in some one or more of the branches included under the term *home economics*. All students who expect to specialize in home economics must report to the Department before completing registration for the first term of the freshman year.

1. **Foods and Nutrition, Survey Course.** Second term, credit three or five hours. May be taken in any year. Only twenty students may be admitted to the laboratory of this course. Lectures and recitations, M W F, 9. Home Economics Building 100. Practice, T Th, 2–5. Home Economics Building 270. Professor ROSE, Miss MOSES, and assistants.

A course intended for students registered in any department of the University who desire a general knowledge of foods and nutrition. The lectures will include a discussion of foods, food preparation, and various phases of human nutrition. Laboratory fee, $10.

2. **House Practice.** First and second terms, credit two hours a term. Open only to freshmen in home economics, and required of them. Lectures: first term, T, 9; second term, M, 11. Home Economics Building 245. Practice, hours by arrangement.

A part of the laboratory work of this course may consist of a period of eight days spent in residence in practice apartment or practice house. Laboratory fee each term, $3.

3. **Foods.** First and second terms, credit, first term four hours, second term five hours. Prerequisite Biology 1, and Chemistry 1 and 6; Chemistry 32, 92, and 93 must precede or accompany this course; should be taken in the sophomore year. First term: Lecture, M, 11. Home Economics Building 245. Practice, M W F, 2–5, or T Th S, 8–11. Home Economics Building 270. Second term: Lectures and recitations, M W, 12. Home Economics Building 245. Practice, M W F, 2–5, or T Th S, 8–11. Home Economics Building 270. Professor ROSE, and Misses KNOWLTON, VINTON, HENRY, and MOSES.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the composition and characteristics of foodstuffs; principles of selecting foods and methods of preparing them; comparative nutritive and economic values of various foods. Laboratory practice in applying scientific principles to food preparation will be given. Laboratory fee, $20, each term, part returnable.

4. **Household Sanitation.** First term, credit three hours. Must be preceded or accompanied by Dairy Industry 15 and Physics 1. Lectures, T Th, 12. Home Economics Building 245. Practice, hours by arrangement. Home Economics Building 410. Miss KNOWLTON and others.

The lectures and practice in this course include consideration of the sanitary conditions of the house and site; the relation of bacteriology to the household in cleaning, in the preservation of foods, in diseases, and in disinfection; emergencies and home nursing; personal hygiene, including care of the body in health; heat, light, ventilation, and the disposal of refuse. One lecture each week will be a general lecture of interest to all students. These lectures will give a survey of the field of sanitation, and will as far as possible be given by specialists in the various topics treated. Laboratory fee, 50 cents.

5. **Institution Management.** First and second terms, credit two or more hours a term. Open only to those students who give evidence of ability in this direction. Prerequisites courses 3, 5b, 5c, and 6, or the equivalent. Should be taken in the senior year. Lectures, M, 8. Home Economics Building 100. Practice, hours by arrangement. Miss HUNN and others.

5a. **Institution Management.** Second term, credit two hours. Home Economics Building 100. Practice hours by arrangement. Miss HUNN and others.

A general course in lunch room management for those who wish a knowledge of the problem of feeding large numbers, and who are not specializing in institution management. Laboratory fee, $2.

5b. **Institution Management. Large Quantity Cooking.** First term, credit four hours. Practice, hours by arrangement. Miss HUNN and others.

A course in large quantity cooking intended for juniors who are specializing in institution management. Laboratory fee, $1.

5c. **Institution Management. Institution Buying.** Second term, credit two hours. Practice, hours by arrangement. Miss HUNN and others.

A course in institution buying intended for juniors who are specializing in institution management. Laboratory fee, $2.

6. **Dietetics.** Second term, credit five hours. Prerequisite course 3, Chemistry 32, and Biochemistry 14; should be taken in the junior year. Lectures and recitations, T Th S, 9. Home Economics Building 100. Practice, T Th, 10–1. Home Economics Building 270. Professor ROSE, and Misses KNOWLTON and HENRY.

A course for developing a working knowledge of dietetics. A study of methods of investigating dietary problems and of practical means of applying scientific principles in the planning of dietaries for the family and for institutions; consideration of special problems of nutrition, as in the feeding of infants and feeding in cases of abnormal metabolism. Laboratory work will include practice in estimating, planning, and preparing dietaries. An excursion of three or four days to visit schools and various institutions may be arranged for at the close of the spring vacation; estimated expense, from $10 to $12. Laboratory fee, $12.

7. **Foods and Nutrition, Survey Course.** Second term, credit four hours. Lectures and recitations, M W F, 9. Home Economics Building 100. Practice, to be arranged. Home Economics Building 270. Professor ROSE and Miss MOSES.

A course intended for students who desire a general knowledge of foods, food preparation, and human nutrition. The laboratory work of this course is designed especially to meet the needs of men students who desire a knowledge of nutrition in planning for numbers of employees on the farm or in other occupations. The work is also intended to be a guide to men students in personal selection of food for health and efficiency. Laboratory fee, $5.

8. **Design.** First and second terms, credit three hours a term. To be taken in the junior year; must be preceded by course 11. Lectures: first term, T, 12, Home Economics Building 100; second term, W, 11, Home Economics Building 245. Practice, T Th, 8–11, or M W, 2–5. Home Economics Building 415. Assistant Professor WARNER.

A course dealing with the principles of art expression and their application to the problems of everyday life. In the first term the theory of color and design will be considered, and special application will be made to wearing apparel. The object of the work is to give to students a working knowledge of color and to help them to express themselves appropriately in their clothing. In the second term interior decoration and home furnishing will be considered, and the principles of color and design will be applied to home surroundings. The object of the work is to develop in the students good judgment and taste in the selection and arrangement of home furnishings, to the end that they may express themselves in their environment. Laboratory fee, $3 a term.

9. **Design, Advanced Course.** Second term, credit two hours. Prerequisite course 8. Practice, hours by arrangement. Home Economics Building 415. Assistant Professor WARNER.

This course is open to students who have talent or a special inclination to continue work in design. The nature of the problems will be determined by the needs of the students and by the possibilities for practical application that may develop. Laboratory fee, $3.

10. **The House.** First and second terms, credit two hours a term. Prerequisite course 11; must be accompanied by course 8. Lectures: first term, Th, 12, Home Economics Building 100; second term, F, 11, Home Economics Building 245. Practice: first term, F, 2–5; second term, T, 2–5. Home Economics Building 415. Assistant Professor YOUNG.

A course dealing with the house structure, considered from the standpoint of economics and of architecture, accompanied by the analysis of forceful types of plans and exteriors. The object of the course is to develop in the student rational standards of judgment on housing problems by a discussion of the relation of the house plan to home making, to the individual family, and to the individual site. Special attention will be given to the planning of kitchen and pantry. Laboratory fee, $1 a term.

11. **Elements of Design.** First and second terms, credit one hour a term. Practice: first term, T or Th, 2–5; second term, F, 2–5. Conducted under the supervision of Assistant Professors YOUNG and WARNER, and Miss BLACKMORE.

A fundamental course in drawing for the purpose of studying materials used in the construction and decoration of the house and of clothing.

12. **Woman and the Family.** Second term, credit three hours. Lectures, M W F, 9. Home Economics Building 245. Professor VAN RENSSELAER.

The course embraces a study of woman and the family through early ages to the present time. It treats of survivals with reference to various characteristics and conditions of woman in the family and in the state. Woman's work and her industrial and economic conditions are studied with reference to the home and to society. Opening of occupations and professions to women; laws governing the family; the family a basis of civilization; a study of modern problems of women and the home, suffrage, education, economic function of woman and the family.

13. **Woman in Industry.** First term, credit three hours. Lectures, T Th, 11. Home Economics Building 245. Practice, hours to be arranged. Assistant Professor HAZARD.

A study of woman's gainful occupations, conditions, and problems in town or country from the fifteenth to the twentieth century. The course includes a study of by-industries for farm women, and of the modern factory life, with the problems, advantages, and disadvantages presented by each; and of the history of women as wage-earners before the twentieth century. A laboratory period will be spent in visiting factories, department stores, and offices in the town, and by-industry workers in country homes.

14. **Household Management.** First term, credit three hours; second term, credit two hours. Prerequisite courses 3 and 6, and Political Science 51; intended for seniors. First term: lectures, T Th S, 9. Home Economics Building 100. Second term: practice, by arrangement. Home Economics Building 245. Professor VAN RENSSELAER and Miss KNOWLTON.

The course includes a study of the family income, cost of living, household accounts, problems of domestic service, methods of housekeeping, cost of food, shelter, and clothing. The laboratory work will consist of practice in household accounting, cost and management of food, and use and cost of household conveniences. During the term each student will be required to live for one week in the apartment in the Home Economics Building, and make a study of the problems of administering a small household. Laboratory fee, second term, $8.

15. **Elementary Clothing and Handwork.** First or second term, credit two hours. Practice: first term, T Th, 8–11; second term, T Th, 2–5. Home Economics Building 300. Miss BLACKMORE.

The course includes consideration of the following subjects: the use and care of the sewing machine; making of stitches by machine and by hand; elementary drafting and adaption of patterns; cutting, fitting, and finishing simple undergarments; knitting, crocheting, and simple embroidery. Students provide all material, subject to the approval of the instructor. Estimated expenses, from $5 to $10. Laboratory fee, $2.

16. **Draping, Drafting, and Elementary Dressmaking.** First term, credit two hours. Prerequisite courses 2 and 15; must be accompanied by course 8. Practice, M W, 2–5. Home Economics Building 300. Miss BLACKMORE.

Practice is given in drafting, cutting, fitting, and designing of patterns. All foundation patterns are drafted to measure and fitted. Drafting of a tight-fitting lining, draping of a fitted lining, and draping of original and copied designs in cheesecloth and other suitable materials. Elementary directions given for adjusting patterns to normal and abnormal figures. Making of a few simple models and of an unlined lingerie dress. Students provide all materials; estimated expense, $8. Expense for dress form, $4. Laboratory fee, $3.

17. **Dressmaking.** Second term, credit two hours. Prerequisite courses 2, 15, and 16. Practice, M W, 2–5. Home Economics Building 300. Miss BLACKMORE.

The course includes the cutting and making of a tailored silk shirt waist, a lingerie dress, and an unlined silk or wool dress. Students in this class use as far as possible the material designed in course 16. One garment is drafted or modeled. The work consists in demonstrations, discussions, and practice. The economical purchase of a wardrobe will be considered; also a comparison of commercial products with those made by hand, hygienic factors involved in clothing, and the economic and sociological phases of the clothing industry. Students provide all material, subject to the approval of the instructor; estimated expense, from $15 to $20. Laboratory fee, $2.

18. **Elementary Millinery.** First term, credit one or two hours. Required of all students specializing in clothing and textiles. Practice, M, 10–1, or by arrangement. Home Economics Building 300. Miss BLACKMORE.

The course considers the methods of manipulation in the construction of hats out of wire, cape net, and rice straw; the preparation of trimming; the use and renovating of old materials; the study of color, shape, and trimmings as to suitability, becomingness, and income; criticisms of prevailing styles, and practice in making spring and winter hats of various materials; comparison of cost of the hats made with those in the stores. Students provide all materials; estimated expense, from $6 to $8. Laboratory fee, $2 to $3.

20. **Special Problems.** First and second terms, credit and hours by arrangement. Prerequisite a fundamental knowledge of home economics; open to seniors and graduate students in home economics, and to other qualified persons by special arrangement. No student may register in this course without permission of the heads of the Department. Home Economics Building 100. Members of the department staff and others.

A course intended for the development of the individual student in particular lines of work. Special facilities in lectures and practice classes will be arranged for those intending to teach home economics. The course will include a consideration of the logical methods of organizing and developing courses of study. Problems of original investigation will be planned for graduate students, or for undergraduate students who have proved themselves capable of undertaking such work. Laboratory fee to be determined by the amount of work done. Laboratory fee, $5 for each period.

21. **Experimental Cooking.** First and second terms, credit two hours each term. Second term not given in 1916–17. Prerequisite course 3. Open only to seniors. Hours and place to be announced. Misses BREWER and MOSES. Laboratory fee, $10.50.

22. **Seminary in Nutrition.** Second term, credit one hour. Open only to seniors and graduate students in home economics. Th, 4.30. Home Economics Building 100. Professor ROSE and others.

23. **Extension in Home Economics.** First and second terms, credit three hours each term. Open only to seniors who have given evidence of their ability to develop this work satisfactorily. First term, hours to be announced. Second term, lectures, Th, 9. Home Economics Building 265. Practice, Th, 10–1, 2–5. Home Economics Building 260. Professor VAN RENSSELAER and others.

Laboratory fee, $5 each term.

24. **Primitive Woman.** Second term, credit three hours. Open to juniors and seniors. Lectures, hours by arrangement. Assistant Professor HAZARD.

This course makes a survey of primitive woman of all countries as housekeeper, wife, and mother, and as member of her tribe or social group; the details of her daily work and her development along social, economic, intellectual, and spiritual lines. With these facts as a basis, a careful consideration is given to the inheritance in arts, crafts, myths, and religious ideas, which primitive woman has bequeathed to civilized woman, and the duty of the latter to the present-day primitive women who are the wards of the Nation, whether they are Filipinas, Negroes in the Black Belt, or Indians on New York Reservations.

25. **Seminary in the History of Housekeeping.** Second term, credit one hour. One lecture each week, and one conference each week with each member of the class. Hours by arrangement. Assistant Professor HAZARD.

A survey by historical methods of the housekeeping, the daily rounds, the resources, and the conditions of housekeepers from earliest times to the present. This includes the use of foods, furniture and clothing, utensils, and recipes, by women of Egypt and Rome, of medieval England, of colonial America, and of twentieth century New York.

26. **Accounting and Office Management.** Second term, credit two hours. Open only to seniors in home economics. Lectures, T, 11. Home Economics Building 245. Practice, T, 2–5. Home Economics Building 10. Mrs. BRADFORD and others.

This course will include a treatment of institutional accounts, office practice, and general business management useful in institutions or in the conduct of a department of home economics.

LANDSCAPE ART

Instruction in this Department is planned to meet the requirements of several classes of students, as follows: (1) Students in general agriculture or others who desire a better understanding of the principles underlying landscape development. For such students the Department offers several courses designed to foster an appreciation of landscape in general, and an understanding of the basic principles governing both the arrangement and the beautification of land for various uses. (2) Students in technical courses in this or other colleges of the University whose work is allied to landscape art and who wish a better understanding of such principles of landscape design as relate to their particular field of work. (3) Professional students in landscape art.

The sequence of studies outlined below constitutes a four year professional course in landscape art leading to the degree of bachelor of science. This course includes the required work of the College of Agriculture or the accepted equivalent. It is designed to train the student in the understanding and appreciation of the history and basic principles of landscape architecture; to teach general methods of design, and the application of principles to both design and planting; and to give a fundamental knowledge of plant materials, engineering, and architecture as applied to landscape work.

In the student's senior year he is required to major (register for 10 credit hours) in design, planting, or construction, and also to register for two credit hours in each of the remaining subjects.

A fifth, or graduate, year leads to the special degree of master in landscape design. In this year the student's course is individually organized for specialization within a chosen branch of landscape work, and his general advance in the professional field is fostered.

It is important that on the completion of either the four or the five year course the student should continue his training by means of several years experience in the office of a reputable landscape architect, and if possible by domestic and foreign travel. As far as possible, the Department will aid its students in finding opportunity for office apprenticeship.

Recommended sequence of studies for professional students in landscape art

The subjects in black-faced type are required of all students in the College of Agriculture.

The following schedule is a carefully arranged sequence of courses which, if consistently adhered to, will enable the student to take all required work, and also, without conflict of hours, the electives most important to his needs. Failure to follow this sequence in the first years of the course is likely to complicate later scheduling of work.

All students intending to follow the professional course in landscape art should report to this Department at the beginning of their freshman year.

Freshman year

	Hours 1st term		Hours 2d term
English 1	4	**English 1**	4
Chemistry 1	6	**Chemistry 85**	4
Biology 1	3	**Biology 1**	3
The Farm 1	2	Drawing 2	3
Landscape Art 1	1		

Sophomore year

	Hours 1st term		Hours 2d term		Hours 3d term
Geology 1	3	**Physics 2**	5	Floriculture 8	3
Botany 1	5	**Physiology** (Human Physiology 3 or Plant Physiology 20)	3–4	Floriculture 8a	2
Architecture 9 (Descriptive Geometry)	3	Drawing 4	2	Drawing 3	5
Architecture 11 (Elements of Architecture)	2	Architecture 11 (Elements of Architecture)	4	Landscape Art 13	5
Architecture 13 (Shades and Shadows)	1	Architecture 13 (Shades and Shadows)	1		
Landscape Art 3	2	Landscape Art 9	2		
Landscape Art 4	2				

Junior year

	Hours 1st term		Hours 2d term
Political Science 51	3	**Political Science 51**	3
Architecture 50 (History of Architecture)	1	Architecture 50 (History of Architecture	1
Civil Engineering 10 (Elementary Surveying)	3	Civil Engineering 11a (Topography)	4
Landscape Art 4a	1	Landscape Art 4b	2
Landscape Art 11	4	Landscape Art 11	4
Landscape Art 13a	1	Landscape Art 16	2
Landscape Art 17	2		

Senior year

	Hours 1st term
Architecture 50a (History of Architecture)	1
Landscape Art 15	2–10
Landscape Art 16	2–10
Landscape Art 17a	2–10
Landscape Art 20	1

The above schedule provides for specialization in design, planting, or construction.

Senior students who have not previously taken history of architecture should elect it.

Students who have not offered plane trigonometry for entrance should elect it before the junior year.

Students proposing to specialize in plant work should take plant physiology to satisfy the college requirement in physiology.

Suggested additional electives

	Hours 1st term		Hours 2d term
Soils 1	3	Soils 1	3
Plant Pathology 1	3	Plant Pathology 2	3
Entomology 3	3	Entomology 41	2
Greek Art and Antiquities 1 (History of Greek Sculpture)	3	Geology 30	3
Philosophy 4 (Fine Arts)	3	Greek Art and Antiquities 1 (History of Greek Sculpture)	3
		Architecture 40 (Modern Architecture)	2

Courses in fertilizers and cover crops

Courses suggested for students not taking the professional course in landscape art

Courses 1, 2, 3, 6, and 18 are without prerequisites and may be taken in any order desired. Courses 4, 4a, 4b, 13, 13a, and 14 are open to any student who satisfies the prerequisites or the acceptable equivalent. Advanced courses are open to those who satisfy the Department of their preparation and ability to take the work with profit.

Description of Courses

Instruction is given in the Landscape Art Building.

1. **Appreciation of Landscape.** First term, credit one hour. Lectures, T, 11. Professor DAVIS.

A general course introductory to an appreciation of landscape, and explaining the relation of natural landscape to landscape design. Students intending to specialize in landscape art are advised to elect this course in their freshman year.

2. **Elements of Landscape Design.** Second term, credit one hour. Lectures, W, 10. Professor DAVIS.

A discussion of the first principles involved in landscape development; with especial application to farmsteads, cottage grounds, and smaller suburban properties. The course is intended for students who desire an intelligent point of view in landscape work but do not intend to take the more technical courses in theory.

3. **History of Landscape Design.** First term, credit two hours. Lectures, T Th, 9. Open to general election, and intended for sophomores in landscape art. Professor DAVIS.

A study of the literature and the development of landscape design, and of the influences that have affected it at different periods and in different countries. A comprehensive study of the history of landscape design in relation to the landscape work of the present day. Laboratory fee, $1, to cover cost of blueprint illustrations distributed to the class.

4. **Theory and Æsthetics of Landscape Design.** First term, credit two hours. Prerequisite course 3. Lectures, M W, 11. While this course is primarily for students specializing in this Department and is intended to lead up to the courses in design, it may be elected by others who satisfy the Department of their preparation and fitness to take the work with profit. Professor DAVIS.

Theories of composition applied to landscape design; factors influencing landscape composition; the alignment of roads and walks.

4a. **Theory: Planning of Private Properties.** First term, credit one hour. Prerequisite course 3, and, for students specializing in landscape art, course 4. Lectures, W, 9. Professor DAVIS.

A study of the principles and ideals involved in the development of private properties or residences; a discussion of their application as exemplified in such specific problems as country estates, farmsteads, cottage homes, suburban and city residences. A technical discussion, intended for students specializing in landscape design and also for those who desire a more thorough understanding of the planning of private properties than may be obtained in course 2.

4b. **Theory: Planning of Public Properties.** Second term, credit two hours. Prerequisite courses 3 and 4. Lectures, M W, 12. Professor DAVIS.

A study of the principles involved in the landscape development of public properties and their application; a discussion of city park systems, including large parks, parkways, squares, and playgrounds, and of country villages, with regard to the treatment of streets and village green.

6. **Rural Improvement.** A course of six or more lectures beginning after the Christmas recess. No university credit. These lectures are outlined primarily for winter-course students. Time to be announced. Professor CURTIS.

Brief outlines and discussions of the ways and means of bettering out-of-door conditions. The course deals with questions of rural improvement in such a manner as to enable the student from the farm or the village to appreciate his landscape problems and opportunities, and to gain a point of view in landscape methods. Specific suggestions are offered for the solution of some of the simpler home problems.

9. **Lettering and Indication.** Second term, credit two hours. Prerequisite courses 3 and 4, Architecture 9, 11, and 13. Intended for sophomores in landscape art. Drafting period, F, 2–4.30, and one additional period at the convenience of the student. Mr. MONTILLON.

A series of plates, of lettering and titles, of methods of indication in landscape plans, and of problems involving these. Laboratory fee, $1.50.

11. **Landscape Design, Elementary Course.** First and second terms; credit four hours a term. Prerequisite courses 3, 4, 4a, 9, and 13, Architecture 9, 11, and 13, and Drawing 2, 3, and 4.

Intended for juniors in landscape art. Lectures, F, 10. Criticism, periods to be arranged, and additional drafting hours. Mr. MONTILLON, assisted in judgments by department staff. Laboratory fee, $4 a term.

The solving and drafting of problems which explain and illustrate the theory and principles of landscape design; a study of composition in landscape design and of method in designing; problems based on topographical surveys. The course is a study in graphic expression, and aims to familiarize the student with various types of plans, details, and presentations. It is accompanied by lectures in plan evolution, these being a discussion of plan controlled in its development by existing conditions and by the requirements of usage. An explanation of architecture in relation to landscape design.

13. **Plant Materials.** Third term, credit five hours. Prerequisite Botany 1. Lectures, M, 8; laboratory and field trips, M F, 10–12.30, and 2–4.30. Open to general election, but intended for professional students in landscape art. Professor CURTIS. Laboratory fee, $1.50.

A study of the identification and characteristics of trees, shrubs, and vines for landscape planting.

13a. **Elements of Planting Design.** First term, credit one hour. Prerequisite course 13 or 14. Practice, Th, 10–12.30 or 2–4.30, with occasional lectures during the practice period. Open to general election, but intended for professional students in landscape art. Professor CURTIS. Laboratory fee, $1.50.

A study of composition in trees, shrubs, and vines, including the designing of simple plant groups and their discussion in the field.

14. **Elementary Plant Materials.** First term, credit three hours. Prerequisite Botany 1. Lectures, M, 9. Laboratory and field trips, M W, 2–4.30. Open to general election. Professor CURTIS.

This course is an abridgment of course 13. Laboratory fee, $1.50.

15. **Landscape Design, Advanced Course.** First and second terms, credit ten hours a term. Prerequisite course 11 and its prerequisites, and courses 13 and 13a; intended for seniors in landscape art. Two criticism periods a week, to be arranged, and additional drafting hours. Mr. MONTILLON, assisted by Professor DAVIS in consultation, criticism, and judgment.

The solution of various problems based on topographical surveys; a series of major and sketch problems, presented in different mediums; finished plans accompanied by interpretative sketches, sections, and perspectives; reports and detailed working drawings. Laboratory fee, $5 a term.

16. **Landscape Engineering and Details of Construction.** First and second terms, credit two hours a term. Interrelated with course 15. Prerequisite Civil Engineering 10 and 11a; intended for seniors in landscape art. Lectures, Th, 11. Practice, to be arranged. Professor ——— and Mr. MONTILLON.

The engineering peculiar and necessary to landscape work; methods of survey; drainage methods; types of road and walk construction; finished grade plans; together with mapping in plans, profiles, and sections, modeling, estimates of cost, and specifications.

17. **Planting Design, Elementary Course.** First term, credit two hours. Prerequisite courses 13 and 13a; intended for juniors in landscape art. Lectures, M, 11. Drafting with criticism, hours to be arranged. Professor CURTIS.

A preliminary study of the use, adaptation, and arrangement of plants with reference to the problems of the landscape designer.

17a. **Planting Design, Advanced Course.** Credit two or ten hours. Interrelated with course 15. Prerequisite course 17 and its prerequisites; intended for seniors in landscape art. Drafting, with criticism, hours to be arranged. Professor CURTIS.

A detailed study of the use, adaptation, arrangement, and æsthetic composition of plants with reference to the problems of the landscape designer and landscape gardener, together with nursery lists and estimates of cost.

18. **Propagation.** First and second terms, credit one hour a term. Laboratory, with occasional discussions, T, W, or Th, 2–4.30. Professor CURTIS and Mr. HUNN.

A course in the propagation and growth of woody plants commonly used in landscape planting.

20. **Seminary.** Second term, credit one hour. Intended for seniors in landscape art. Hours to be announced. Department staff.

Discussions of important questions relating to various phases of landscape work, reviews of current literature, and reports on investigations.

Special Lectures and Excursions. Occasionally during the year, at times to be announced, special lectures on landscape subjects will be held under the auspices of the Department. Representative landscape architects, park superintendents, and gardeners will be speakers. While these lectures are open to the public, they are intended to augment departmental instruction and should be of special interest to the student in landscape art.

In the course of, or at the end of, each year, inspection trips will be taken for the purpose of studying, at first hand, important examples of good American landscape work.

METEOROLOGY

1. **Meteorology and Climatology.** First or second term, credit three hours. Lectures, T Th, 10. Dairy Building 222. Laboratory, M, T, W, Th, or F, 2–4.30. Dairy Building 119. Students should consult the Department in regard to laboratory assignments. Professor WILSON and Mr. HAUSMAN.

This is a course designed to acquaint the student with the principles of the general and secondary circulation of the atmosphere; the elements of weather and climate; practical weather forecasting from weather maps and local observations. The laboratory work consists of demonstrations, recitations, practice, and comparative studies of general and local weather and climate in relation to agriculture and other industries. Laboratory fee, $1.

PLANT BREEDING

1. **Genetics.** First term, credit three hours. Prerequisite Botany 1 and 20. Lectures, T Th, 8. Caldwell Hall 100. Recitations: section a, W, 11; section c, W, 12; section e, F, 12; section g, S, 8. Forestry Building 210. Section b, W, 11; section d, W, 12; section f, F, 12. Forestry Building 212. Other recitation sections may be scheduled if necessary. Assistant Professor BARKER, and Messrs. FRASER and ———.

A general introductory course, designed to give students an understanding of the laws of variation and heredity, and forming a foundation for future work in plant breeding, animal breeding, or eugenics. The laws of variation and heredity, the theory of mutation, Mendel's law, and general evolutionary topics will be considered.

2. **Plant Breeding, Laboratory Course.** First term, credit one hour. Must be preceded by course 1. Laboratory, M or F, 2–4.30. Forestry Building 212. Messrs. FRASER and BREGGER.

Studies in variation; the collection and preparation of herbarium specimens of variations in the plant kingdom; field and laboratory studies of crops and breeding systems; the collecting and collating of biological data by means of the biometrical method; the laws of segregation, recombination, and probability; with special reference to the relation of these studies to the plant breeder. Laboratory fee, $3.

6. **Plant Breeding, General Course.** Third term, credit four hours. Prerequisite Botany 1 and 20. Lectures, W F, 9. Recitations, M, 9. Forestry Building 210. Laboratory, M, 2–4.30. Forestry Building 212. Assistant Professor BARKER and Mr. FRASER.

A general introductory course treating of variation, the laws of heredity, and selection. Equivalent to courses 1 and 2. Laboratory fee, $3.

8. **Methods of Plant Breeding.** Second term, credit two hours. Prerequisite course 1 or 6. Must be preceded or accompanied by course 2 or its equivalent. Lectures, W F, 8. Forestry Building 210. Professor MYERS and members of the departmental staff.

A study of the application of genetic principles to plant breeding. A consideration of methods, technique, and results, as exemplified by work with specific crops.

Advanced and Graduate Courses

11. **Biometry.** First term, credit two hours. For graduate students only. Lectures, M, 11. Forestry Building 210. Laboratory, W, 2–4.30. Forestry Building 212. Professor LOVE.

A discussion of statistical methods as applied to problems in biology and genetics. The course is designed primarily to develop methods for the study of variation, correlation, curve fitting, and the like.

13. **Genetics, Advanced Course.** Second or third term, credit three hours. Primarily for graduate students. Seniors admitted by special arrangement only. Prerequisite courses 1 and 2, or 6 and 8, and Botany 1, 10, and 20. Lectures, T

Th, 9. Forestry Building 210. Laboratory, W, 2–4.30. Forestry Building 212. Second term, Professors EMERSON, LOVE, and MYERS, and Mr. LINDSTROM; third term, Professor HUTCHISON and Mr. FRASER.

Lectures on special topics in genetics. The present status and the more important problems in Mendelism, linkage, sex inheritance, the pure-line question, selection, the mutation theory, and the like. Laboratory studies of Mendelian ratios, linkage, sex inheritance, and the like. Laboratory fee, $3.

14. **Organic Evolution.** First term, credit two hours. For seniors and graduate students. Prerequisite course 1 and 2, or 6. Lectures, M F, 9. Forestry Building 210. Assistant Professor BARKER.

A general survey of the development of the theory of evolution from its inception in early Greek times to the present, treated from the biological point of view.

15. **Theory of Experimental Practice.** Prerequisite courses 1 and 2, or course 6. First term, credit one hour. W, 9. Assistant Professor BARKER.

An advanced course for seniors and graduate students who purpose to engage in independent research. Lectures and reports on modes of attack on genetical problems; the inductive and experimental methods; pedigree culture; record keeping; planning of experiments, and the like.

16. **Research.** Throughout the year. For graduate students only. By appointment. Forestry Building. Professors EMERSON, HUTCHISON, LOVE, and MYERS, and Assistant Professor BARKER.

Investigation of problems in plant breeding, heredity, and variation.

17. **Seminary.** First and second terms, one hour a term. For graduate students only. S, 9–10.30. Forestry Building 212. Professors EMERSON, HUTCHISON, LOVE, and MYERS, and Assistant Professor BARKER.

A seminary for the discussion of current genetical literature and for the presentation of reports on research problems.

PLANT PATHOLOGY

1. **Plant Pathology.** Prerequisite Botany 1 and 20 or equivalent general botany and plant physiology. Lectures, first or third term, credit one hour. M or Th, 10. Must accompany or follow recitations and practice. First term, Home Economics Building 245; third term, Caldwell Hall 100.

Recitations and laboratory periods in limited sections as follows:

GENERAL AGRICULTURE SECTION. First term, credit three hours. Recitation, Th or F, 12. Agronomy Building 192. Practice, W F, 2–4.30, or M T, 2–4.30. Bailey Hall, West Basement.

POMOLOGY SECTION. First or third term, credit three hours. Recitation, Th or F, 12. Roberts Hall 292. Practice, Th, 2–4.30, and S, 10.30–1, or M T, 2–4.30. Bailey Hall, West Basement.

FORESTRY SECTION. First term, credit three hours. Recitation, F, 12, or S, 11. Practice, T Th, 10–12.30, or M, 10–12.30, and W, 8.30–11. Bailey Hall, West Basement.

VEGETABLE GARDENING SECTION. First term, credit three hours. Recitation, F, 12. Home Economics Building 100. Practice, W F, 2–4.30. Bailey Hall, West Basement.

FLORICULTURE SECTION. First term, credit three hours. Recitations, Th, 12. Caldwell Hall 143. Practice, Th, 2–4.30, S, 10.30–1. Bailey Hall, West Basement.

Professor WHETZEL, Assistant Professors GREGORY, HESLER, and RANKIN, Doctor MASSEY, Messrs. CHUPP, and ——.

A fundamental course treating of the nature, cause, and control of plant diseases, illustrated by studies of the commoner diseases of cultivated crops. Students specializing in those lines indicated by the names of the sections will be expected to schedule their work accordingly. The practice work must be taken in the couplets announced above. Practice sections limited to twenty-four students each. Laboratory fee, $4.50; breakage deposit, $2.

2. **Principles of Plant Disease Control.** Prerequisite course 1.

GENERAL AGRICULTURE SECTIONS. Second or third term, credit three hours. Second term: Recitation, Th or F, 12. Home Economics Building 100. Practice, W F, 2–4.30, or Th, 2–4.30, S, 10.30–1. Bailey Hall, West Basement. Third term: Recitation, Th, 12. Home Economics Building 100. Practice, Th, 2–4.30, S, 10.30–1. Bailey Hall, West Basement.

FORESTRY SECTIONS. Second term, credit two hours. Recitation, F, 11 or 12. Bailey Hall, West Basement. Practice, T, 10–12.30, or Th, 10–12.30. Bailey Hall, West Basement.

Professor WHETZEL, Assistant Professors GREGORY, HESLER, and RANKIN, and Messrs. CHUPP, ———, and ———.

A consideration of the principles and the methods of control of plant diseases. This will include studies on: exclusion by laws, regulations, quarantine, and inspection; eradication by pruning, seed selection, tree surgery, rotation, disinfection, and other means; protection by spraying, dusting, wound dressing, and the like; immunization by selection, breeding, feeding. The practice sections must be taken in the couplets announced above. Laboratory fee, $1.50 per each hour credit; breakage deposit, $2.

3. **Plant Pathology, Advanced Course.** First term, credit two hours. Prerequisite course 1. Lecture, F, 9. Practice, F, 10–12.30. Bailey Hall, West Basement. Various phases of the work given successively by Professor WHETZEL, and Assistant Professors RANKIN, FITZPATRICK, HESLER, and BLODGETT.

A study of the methods and practices developed in the Department with respect to departmental organization, the use of the library and herbarium, the preparation of exhibition and illustration material, the selection of class study material, outline making, and the like. A course designed primarily for students expecting to specialize in plant pathology. Laboratory fee, $1.50; breakage deposit, $2.

6. **Elementary Mycology.** Second or third term, credit three hours. Prerequisite Botany 1 or its equivalent, and permission to register. Not given to a class of less than five students. Lecture, T, 11. Home Economics Building 100. Practice: second term, M W, 2–4.30; third term, M T, 2–4.30. Bailey Hall, East Basement. Assistant Professors FITZPATRICK and HESLER, and Messrs. DICKSON and HOPKINS.

Comparative studies of the morphology, life history, and classification of the fungi. A general introductory course in mycology for undergraduates. Laboratory fee, $4.50; breakage deposit, $2.

9. **Timber Decay and Its Prevention.** Second term, credit one hour. Prerequisite course 1. Lectures, T, 10. Bailey Hall, West Basement. Assistant Professor RANKIN.

A course treating of the cause, nature, and relation to environment of the commoner decay processes of wood, and a consideration of the fundamental principles involved in the preservation of timber for commercial uses. Designed especially for students in forestry, but fundamental as well for general farm practice.

11. **Methods in Plant Pathology.** Second term, credit three hours. Prerequisite course 1. Lecture, W, 10. Practice, T Th, 2–4.30. Bailey Hall, East Basement. Assistant Professor FITZPATRICK and Mr. DICKSON.

A course designed to give special and thorough training in laboratory methods employed in plant pathology, especially culture work, isolation, inoculation, sectioning, staining, making of drawings, preparation of manuscript, proof reading, and the like. Laboratory fee, $6; breakage deposit, $2.

Advanced and Graduate Courses

12. **Mycology.** First and second terms, credit four hours per term. Prerequisite Botany 1. Lectures, M W, 11. Agronomy Building 192. Practice, M W, 2–4.30. Bailey Hall, East Basement. Assistant Professor FITZPATRICK and Mr. DICKSON.

Designed especially for students who wish to specialize in plant pathology or mycology. The taxonomy and phylogeny of the fungi (Phycomycetes, Ascomycetes, and Fungi Imperfecti). Course 12 alternates with courses 14 and 16. Laboratory fee, $4.50 a term; breakage deposit, $2 a term.

[14. **Mycology.** First term, credit four hours. Prerequisite Botany 1. Assistant Professor FITZPATRICK.] Not given in 1916–17.

A continuation of course 12 (Basidiomycetes). Courses 14 and 16 alternate with course 12. Laboratory fee, $4.50; breakage deposit, $2.

15. **Phytopathological Histology.** First or second term, credit three hours. Prerequisite course 1 and Botany 9. It is also recommended that prospective students take course 3 or Botany 10. Lecture, Th, 11. Home Economics Building 100. Practice, F, 2–4.30, S, 10.30–1. Bailey Hall, East Basement. Assistant Professor FITZPATRICK and Mr. DICKSON.

The course is designed to be a study of the types of histological modifications of plant tissues under traumatic and pathogenic conditions. The more useful microchemical tests will be given in the early part of the term. Each student will be expected to make during the term an investigation of some histopathological problem. Laboratory fee, $6; breakage deposit, $2.

[16. **Bacterial Diseases of Plants.** Second term, credit four hours. Prerequisite course 1 and elementary bacteriology Assistant Professor FITZPATRICK.] Not given in 1916–17.

Designed for students who are specializing in plant pathology. A course dealing with slime mold and bacterial phytopathogenes. Systematic and cultural studies. Laboratory fee, $6; breakage deposit, $2.

20. **Research.** Throughout the year, not less than three hours a term. Professors WHETZEL, REDDICK, and BARRUS, and Assistant Professors FITZPATRICK, STEWART, GREGORY, HESLER, RANKIN, and BLODGETT.

Original investigation of problems in plant pathology. Laboratory fee, $1.50 a credit hour.

24. **German Phytopathological Reading.** First and third terms, credit one hour. Hours by arrangement. Open only to advanced and graduate students in plant pathology. Bailey Hall. Professor WHETZEL.

25. **Seminary.** First and second terms. Required of all graduate students in plant pathology. Th, 4.30–5.30. Bailey Hall, West Basement. Members of department staff.

POMOLOGY

1. **Pomology.** First or second term, credit three hours. Prerequisites for regular students Biology 1 and the Farm Practice requirements, or Botany 1 and 20. Course limited to one hundred and five students each term, and both regular and special students must obtain permission to register. Lectures, T Th, 11. Roberts Hall 292. Laboratory: First term, Th or F, 2–4.30, or S, 8–10.30. Roberts Hall 202. Second term, Th or F, 2–4.30, or S, 10.30–1. Roberts Hall 202. Professor CHANDLER, and Messrs. OVERHOLSER, HEINICKE, CARRICK, and DEMOTT.

A study of the general practices in pomology; propagation and care of orchard trees and small fruits; harvesting, storing, and marketing fruit. Practical work in budding, grafting, pruning, and planting; study of varieties, nursery trees, and fruit buds. Laboratory fee, $3.50.

8. **Fruit Varieties, Judging, and Packing.** First term, credit one hour. Prerequisite course 1. Practice, M, T, or W, 2–4.30. Messrs. OVERHOLSER, HEINICKE, CARRICK, and DEMOTT.

In addition to a study of varieties and the judging of fruit, each student will become acquainted with the methods of packing apples in barrels and boxes. The preparation of the fruit exhibit at the College is required of students in this course. Students in this course may compete for judging teams to do practical judging at the annual meetings of the state horticultural societies at Rochester. Laboratory fee, $3.50.

10. **Systematic Pomology.** Second or third term, credit two hours. Prerequisite courses 1, 8, and Botany 1. Lectures or recitations; F S, 8. Roberts Hall 292. After April 15 in the second term and August 15 in the third term, a laboratory period, S, 8–10.30, is substituted for the Saturday lectures. Messrs. OVERHOLSER, HEINICKE, CARRICK, and DEMOTT.

A study of the botanical and physiological characteristics of all species of fruit-bearing plants, with special reference to their cultural requirements. The characteristic cultural methods of each fruit not discussed in a previous course are considered. Each student is required to collect and mount herbarium specimens of a number of fruit-bearing species. Laboratory fee, $1.

11. **Orchard Field Trip.** Credit one hour. Prerequisite courses 1, 8, and 10, and permission to register. To be taken during the three weeks preceding the opening of the first term. Students who wish to take this trip must signify their intention by July 20 preceding. Expense of the trip must be met by the individual student. Messrs. OVERHOLSER, HEINICKE, and PECK.

The course is designed to give the students who specialize in pomology, intimate knowledge of practical orchard conditions.

12. **Experimental Pomology.** Second term, credit two hours. Prerequisite courses 1, 8, 10, and Botany 1, and permission to register; must be preceded or accompanied by Botany 20, Plant Pathology 1, Entomology 3, and Soils 1. Lectures, M T W Th, 8, during the first half of the term. Roberts Hall 292. Professor CHANDLER.

A systematic study of the sources of knowledge and opinions as to practices in pomology; methods and difficulties in experimental work in pomology; and results of experiments that have been concluded or are being conducted.

13. **Pomology, Advanced Laboratory Course.** Third term, credit one hour. Prerequisite courses 1, 8, 10, and 12, and permission to register. Hours to be arranged. Messrs. HEINICKE, CARRICK, and DEMOTT.

This course is designed to give more extended practice in the various nursery and orchard operations than can be given in course 1. It is intended for students doing their major work in pomology.

19. **Research.** Throughout the year, credit from one to three hours a term. Open to graduate or other students who have had courses 10, 12, Botany 1 and 20, Plant Pathology 1, Entomology 3, and Chemistry 1 and 38. Professors CHANDLER and REES.

Students who have not had the above prerequisites but who wish to do reading in some special line, may have the assistance of members of the Department, but will not receive credit for the work.

20. **Seminary.** First term. Required of graduate students in pomology. F, 8. Roberts Hall 292. Members of the department staff.

POULTRY HUSBANDRY

1. **Poultry Husbandry.** First or third term, credit three hours. First term: Lectures, M W, 11. Poultry Building 375. Practice, M, T, W, Th, or F, 2–4.30. Poultry Building 300. Third term: Lectures, T Th 11. Poultry Building 375. Practice, W, 2–4.30. Poultry Building 300. Professor RICE, and Messrs. CHARLES and ———.

An introductory and prerequisite course for students desiring to take specialized courses in poultry husbandry. Those desiring a general course should see courses 2a, 3, 3a, and 10. The course includes the anatomy and physiology of poultry; the study of the egg; embryology; nomenclature; bibliography; environmental conditions; the history and scope of poultry husbandry.

1a. **Poultry Husbandry.** Second term, credit three hours. Prerequisite course 1. Lectures, W F, 9. Poultry Building 375. Practice, Th or F, 2–4.30, or S, 8–10.30. Poultry Building 300. Professor RICE, and Messrs. DANN and ———.

Principles and practice of poultry breeding; incubation and brooding; diseases, parasites, and sanitation.

2. **Poultry Feeds and Feeding.** First term, credit two hours. Prerequisite course 1. Must be preceded or accompanied by Animal Husbandry 1. Lectures or recitations, T, 10. Practice, T or W, 2–4.30. Poultry Building 325. Messrs. DANN and ———.

The physiology of digestion; a study of feeds suitable for poultry; the principles of feeding for egg production, fattening, and rearing; the compounding of poultry rations.

2a. **Flock Management.** First, second, or third term, credit one hour. Must be preceded or accompanied by course 2 or by course 10, and preferably also by Animal Husbandry 1. Practice periods and extra time arranged by appointment. Practice, reporting three times daily, including Sunday, for four weeks, 7.45–8.30, 12.45–1.15, 4.30–5, except during the first term when night period is 4.15–4.45. Poultry Building. Messrs. DANN and ANDREWS.

Practice in record keeping, and management of fowls for egg production and for fattening, including preparation for market. A series of observations and tests will be carried on by the class. Assigned reading and a written examination will be required.

3. **Incubator Practice.** First, second, or third term, credit one hour. Must be preceded or accompanied by course 1a or by course 10. Practice periods and extra time arranged by appointment. Practice, reporting three times daily, including Sunday, for four weeks, 7.45–8.30, 12.45–1.15, 4.30–5. Poultry Building 1. Professor RICE, and Messrs. BUCHAN and ———.

Practice in operating incubators, testing eggs, keeping records, and comparison of results. A series of interesting tests will be carried on by the members of the class. Assigned reading and a written examination will be required.

3a. **Brooder Practice.** First, second, or third term, credit one hour. Must be preceded or accompanied by course 1a or by course 10. Practice periods and extra time arranged by appointment. Practice, reporting three times daily, including Sunday, for four weeks, 7.45–8.30, 12.45–1.15, 4.30–5, except during first term when night period is 4.15–4.45. Poultry Building. Professor RICE, and Messrs. BUCHAN and ———.

Practice in the management of a brooder and a flock of chickens; the keeping of temperature, food, and growth records. Assigned reading and a written examination will be required.

4. **The Breeds and Judging.** First term, credit two hours. Prerequisite course 1. Lectures or recitations, Th, 10. Poultry Building 375. Practice, Th or F, 2–4.30, or S, 8–10.30. Poultry Building 175. Messrs. KENT and ———.

The origin, history, and classification of breeds of domestic poultry; judging the principal breeds for fancy and utilitarian points by score-card and comparison methods; and fitting fowls for exhibition. A required trip will be made to one of the leading poultry shows.

4a. **Judging, Advanced Course.** First term, credit two hours. Prerequisite course 4 and permission to register. Practice, W, 2–4.30, and a three hour period by appointment. Poultry Building 175. Mr. KENT.

This course is designed to give additional practice in judging and in preparation for exhibits. Special emphasis will be placed on utility selection.

5. **Poultry-house Design and Construction.** First term, credit two hours. Prerequisite course 1 and permission to register. Lectures or recitations, F, 11. Poultry Building 375. Practice, M T W, 2–4.30. Poultry Building 325. Messrs. KENT, BUCHAN, and ———.

A study of principles of poultry-house construction; planning, arranging, and designing poultry houses; estimating the cost of buildings; studying building plans; practice in erecting and remodeling houses and in making appliances. An excursion to neighboring farms will be made.

6. **Poultry for the Household.** Second term, credit two hours. Lectures or recitations, S, 9. Poultry Building 375. Practice, S, 10–12.30. Poultry Building 300. Assistant Professor BENJAMIN and Mr. YOUNG.

This course is given primarily for students in home economics, but is open to others who have had satisfactory preparation for the work. Students taking or having taken course 7 may not register in this course.

The course includes a study of changes that take place in poultry flesh and in eggs while they are being held; the principles involved in buying poultry and poultry products; drawing, trussing, deboning, and carving; a comparative study of meat quality as affected by many factors. The use of dessicated, frozen, cold-storage, and preserved eggs, as well as the comparative quality of all other grades of eggs, will also be considered.

7. **Market Products.** Second term, credit two hours. Prerequisite course 1. Lectures or recitations, M, 11. Poultry Building 375. Practice, M, T, or W, 2–4.30. Poultry Building 100. Assistant Professor BENJAMIN, and Messrs. CHARLES and ——.

Students taking or having taken course 6 may not register in this course.

This course deals with the preparation of poultry and eggs for market, and with storage and preservation. It includes caponizing, killing, picking, drawing, and packing poultry; testing, candling, grading, packing, and shipping eggs. Types of market packages will be studied. A class trip to New York for the three days immediately following the Easter vacation is required of all students. This trip gives the students an opportunity to become familiar with the live- and the dressed-poultry markets, exchanges, cold-storage plants, egg-breaking establishments, commission and wholesale dealers, city markets, hotel buyers, housewives' organizations, and leaders in market work. The total necessary expense is about $20.

7a. **Marketing Practice.** First, second, or third term, credit one hour. Prerequisite course 7 and permission to register. Discussion hour, T, 4.45–5.45. Practice period, three hours each week, to be arranged by appointment. Poultry Building 100. Assistant Professor BENJAMIN, and Messrs. CHARLES and ———.

This course is for those who desire additional instruction and practice in the handling of poultry products and refrigeration machinery, and in general salesroom work.

The work is so arranged that it is different in each of the three terms. Students may register for the course in any two of the three terms of work.

8. **Poultry Farm Management.** Second term, credit two hours. Prerequisite courses 1, 1a, 2, 4, and 5; must be preceded or accompanied by courses 2a, 3, 3a, and 7; must be preceded or accompanied by Farm Management 1 and 2. Lectures or recitations, W, 11. Practice, Th, 2–4.30. Poultry Building 350. Professor RICE and Mr. CHARLES.

The principles of farm management as applied to the poultry farm; selection of the farm; use of poultry-farm score card; farm layout and arrangement of buildings; study of farm records. As a final problem each student will work out plans for the management of a poultry enterprise that seems most adaptable to his personal needs, taking into consideration farm layout, buildings, stock, equipment, methods of hatching, rearing, housing, feeding, breeding, marketing, cost accounting, and other factors necessary in the handling of a poultry farm project. The course will include several required excursions to representative poultry plants in April and May, at an approximate cost of $12.

9. **Commercial Marketing.** Second term, credit two hours. Prerequisite course 7. Lectures or recitations, T Th, 11. Poultry Building 375. Assistant Professor BENJAMIN and Mr. YOUNG.

A course designed for students who wish to obtain further instruction relative to the selling of poultry products. The use of advertising will be considered, also methods and problems of food distribution, and general economic phases of the business. An extensive problem in market distribution of poultry products will be an important part of the work.

10. **Farm Poultry.** Second or third term, credit three hours. Second term. Lectures, T Th, 9. Poultry Building 375. Practice, M, T, W, Th, or F, 2–4.30. Poultry Building 300. Third term: Lectures, M W, 11. Practice, M, 2–4.30. Professor RICE, Assistant Professor BENJAMIN, and Messrs. KENT and DANN.

This course is for persons who are not specializing in poultry husbandry. It is not open, without special permission, to students who have had other courses in poultry husbandry.

A brief general course dealing with the practical application of the principles of poultry husbandry to general farm conditions.

11. **Undergraduate Conference.** First, second, or third term, or throughout the year, credit one hour per term. Prerequisite course 8 and permission to register. M, 4.45–5.45. Poultry Building 325. Members of the department staff.

Round-table discussion of poultry literature and current problems of interest to the advanced student of poultry husbandry, including critical examinations of experiment station literature and research methods relating to poultry. Written reports will be required on many of the subjects discussed.

11a. **Seminary.** First, second, or third term, or throughout the year. For graduate students only; required of all graduate students in poultry husbandry. Th, 4.45–5.45. Poultry Building 325. Members of the department staff.

An advanced discussion of work in poultry husbandry.

12. **Research.** First, second, or third term, or throughout the year, credit one to three hours a term. Prerequisite permission to register and must be preceded or accompanied by courses 8 and 11. Time arranged by appointment. Poultry Building. Professor RICE, Assistant Professor BENJAMIN, and Messrs. KENT, DANN, and CHARLES.

An original investigation of a problem in poultry husbandry, to be presented as a written thesis.

RURAL ECONOMY

1. **Agriculture.** First term, credit two hours. Open only to freshmen. Lectures, T Th, 11. Caldwell Hall 100. Professor LAUMAN.

A brief general survey of agriculture in its technical, economic, social, and historical aspects.

4. **Economic and Social Status of the Rural Community.** First term, credit three hours. Prerequisite Political Science 51. Lectures, M W F, 9. Goldwin Smith B. Professor LAUMAN, and Messrs. PHILLIPS and WORKING.

A study of the factors underlying the present conditions in rural communities at home and abroad. The course does not consider the economic problems of the individual farm (farm management), but attempts to point out the forces at work in shaping the agriculture of the world along both economic and social lines.

5. **Marketing and Prices.** First term, credit three hours. Prerequisite Political Science 51. Lectures, M W F, 11. Caldwell Hall 100. Professor LAUMAN, and Messrs. PHILLIPS and WORKING.

A study of the distribution of products, markets, the requirements of markets, methods of marketing, and the course of prices, with special reference to agricultural products.

6. **History of Agriculture.** Second term, credit three hours. Open only to seniors. Lectures, M W F, 9. Forestry Building 210. Professor LAUMAN.

The important phases of the development of agriculture are considered historically. Special stress will be laid on the rise of the agricultural classes and on agrarian problems, as well as on the beginnings of rational agriculture.

7. **Rural Economy.** Second term, credit three hours. Open only to seniors who have had course 4. Lectures, T Th, 11. Home Economics Building 370. Professor LAUMAN.

A more extended study, primarily theoretical, of the general economic problems of agriculture.

8. **Cooperation.** Second term, credit three hours. Prerequisite Political Science 51. Lectures, M W F, 11. Caldwell Hall 100. Professor LAUMAN, and Messrs. PHILLIPS and WORKING.

A study of cooperation, primarily for economic ends, in its general principles, in its historical setting, and in its practice. Special reference will be made to agriculture and the conditions prevailing in the United States.

12. **Research in Rural Economy.** Credit two or three hours a term. For seniors who have done superior work and for graduates. Home Economics Building 370. Professor LAUMAN.

14. **Seminary.** Tuesday afternoons. For students who have had courses 4 and 7, or by special permission. Home Economics Building 370. Professor LAUMAN.

In 1916–17 a study will be made of von Thünen's *Der Isolierte Staat*, Part I. The edition used will be that of H. Waentig, published by Gustav Fischer at Jena, 1910.

16. **Rural Organization.** Second term, credit one hour. Open only to seniors. Prerequisite course 4 and Farm Management 2. Lectures, M, 10. Roberts Hall 392. Professor BURRITT.

A study of rural community organization as exemplified in farm bureaus, designed to familiarize students with this movement. A county problem will be assigned.

A limited number of students will be given an opportunity to obtain practical field experience as assistants to farm bureau managers in field demonstration work during the Easter vacation, and not to exceed five additional days either just preceding or immediately following the vacation period.

RURAL EDUCATION

Students in agriculture and home economics who desire to teach should so adjust their work that on completion of their course they will be entitled to a recommendation for a certificate to teach these subjects.

1. **Agriculture in the High School.** Second and third terms, credit three hours. Open to seniors and juniors who have completed the prerequisites in education and have met the farm practice requirements. Students must arrange with the Department for a practice period before registering for the course. Lectures, M W, 8. Caldwell Hall 143. Professor WORKS and assistant.

A study of the purposes of vocational agriculture, organization and presentation of subject matter, textbooks, and home-project and extension activities of the high school. Laboratory fee, $1.

2. **Home Economics in the High School.** Second term, three hours. Open to juniors and seniors who have completed the prerequisites in education. Lectures, M W, 11. Home Economics 100. Students must arrange for a practice period before registering for the course. Professor WORKS and Miss VINTON.

Selection, organization, and presentation of subject matter for home economics subjects in the high school. Equipment, references, and purposes of home making in the secondary school.

5. **Teaching.** First or second term, credit, not to exceed five hours, to be determined by work done. Open to a limited number of seniors in agriculture and home economics. Students planning on taking this course should arrange with the Department during their junior year. Professor WORKS.

This course is designed to give students an opportunity to teach under the guidance of the Department.

7. **Investigation.** Second and third terms. Open only to graduate students who have had previous preparation in education. Hours by appointment. Professor WORKS.

8. **Seminary.** Second and third terms. No credit. Required of all graduate students. Professor WORKS.

Study of assigned problems, readings, and discussions.

RURAL ENGINEERING

3. **Farm Mechanics.** First, second, or third term, credit three hours. Prerequisite Drawing 1 or its equivalent. First and second terms: lectures, T, 10, Caldwell Hall 100; recitations, time and place to be announced; practice, M, T, or W, 2–4.30, Rural Engineering Building. Third term: lectures, W, 12, Caldwell Hall 100; recitations, time and place to be announced; practice, F, 2–4.30, Rural Engineering Building. First and third terms, Messrs. HAZEN and MORDOFF; second term, Professor H. W. RILEY.

A study of the principles of operation, the details of construction, and the practical operation and care of: A—Machinery, including gasoline engines, devices for transmitting power, hydraulic rams, pumps, spray nozzles, spraying outfits, water-supply outfits. B—Implements, including mowers, grain binders, and binder attachments, with a discussion of the special mechanical features of some of these implements now on the market. Laboratory fee, $3.

4. **Steam Machinery.** Second term, credit one hour. Prerequisite course 3. Lectures, M, 11. Caldwell Hall 143. Professor H. W. RILEY.

A brief lecture course on the principles of construction, installation, operation, and care of steam boilers, steam engines, and steam accessories, and piping for steam.

19. **Research in Farm Mechanics.** Second or third term, credit one or more hours. Prerequisite course 3 or its equivalent, and permission to register, together with natural ability in mechanical practice. Professor H. W. RILEY.

Special work in farm mechanics on problems under investigation by the Department or of special interest to the student, provided, in the latter case, that the Department can furnish adequate facilities.

20. **Farm Engineering.** First, second, or third term, credit three hours. Prerequisite plane geometry; students are urged to take Drawing 1 in preparation for this course. Lectures: first term, M W, 10, Caldwell Hall 100; second term, M W, 8, Caldwell Hall 100; third term, T Th, 10, Caldwell Hall 143. Practice: first term, M, T, or W, 2–4.30; second term, M or T, 2–4.30; third term, W, 2–4.30. Caldwell Hall 400. First and second terms, Assistant Professors ROBB and MCCURDY; third term, Mr. STRAHAN.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; locating, digging, and laying drains; laying out building foundations and farm water-supply and sewage-disposal systems. From the data obtained in the field a contour map will be drawn for one of the fields near the College. Attention is given also to concrete construction, the simple design of structures, and estimates of their cost. Laboratory fee, $3.

21. **Drainage and Irrigation.** (Same as Soils 21.) Second term, credit three hours. Prerequisite courses 3 and 20 or the equivalent, Soils 1, and Drawing 1 or its equivalent. Lectures, M W, 12. Caldwell Hall 143. One discussion per week to be arranged. Practice, Th, 2–5. Caldwell Hall 400. Professor BIZZELL, Assistant Professors ROBB and MCCURDY.

A course given in cooperation with the Department of Soil Technology, covering the principles and practice of drainage and irrigation. Two one-day excursions to drainage or irrigation projects at some distance from Ithaca will be held sometime in May. Laboratory fee, $3.

28. **Farm Engineering, Advanced Course.** First, second, or third term, credit two or more hours. Prerequisite course 20 or its equivalent, and permission to register. Lectures, T, 8. Caldwell Hall 272. Practice, one problem as assigned. Assistant Professor ROBB.

30. **Farm Structures.** Second or third term, credit two hours. (Will not be given for less than five students.) Prerequisite Drawing 1 or its equivalent. Second term: drafting periods, any two, M, T, or W, 10–12.30, or Th, 2–4.30. Third term: drafting periods by appointment. Caldwell Hall 400. Mr. STRAHAN.

A study of building materials used on the farm; the principles of lighting, ventilation, sanitation, floor spacing, and construction, for barns, stables, and other farm buildings, and their application in practice.

SOIL TECHNOLOGY

1. **Principles of Soil Management.** First, second, or third term, credit three hours. Prerequisite Chemistry 1 and Geology 1. Lectures, T Th, 9. Caldwell Hall 100. One laboratory period a week, M, T, W, Th, or F, 2–4.30. Caldwell Hall 49. One recitation a week M, 10, Caldwell Hall 143, or M, 11, Caldwell Hall 282, or T, W, Th, or F, 10 or 11, Caldwell Hall 143. Students must consult the Department in regard to laboratory and recitation appointments before registering for the course. First and third terms, Assistant Professor BUCKMAN; second term, Professor BIZZELL.

A comprehensive course dealing with the origin, composition, and properties of soils, with particular reference to their management in crop production. The laboratory work consists in practice designed to demonstrate fundamental physical relations. Laboratory deposit, $3.

2. **Soils, Elementary Course.** First term, two hours, without credit towards graduation. Must be preceded or accompanied by Chemistry 91. Designed for special students. Lectures, M F, 9. One recitation a week by appointment. Caldwell Hall 143. Assistant Professor BUCKMAN.

A practical course in soils, dealing with origin, composition, properties, and modes of handling. The lectures will consist of a practical discussion and demonstration of (a) the formation and classification of soils; (b) tilth; (c) soil moisture and its management; (d) soil amendments; (e) fertilizers and manures; (f) soil biology; (g) soil management from the standpoint of plant production.

5. **Soil Surveying.** Third term, credit two hours. Prerequisite course 1 and Physical Geography 5. Practice by appointment. Field and Caldwell Hall 143. Assistant Professor BUCKMAN.

A course considering the practical as well as the technical and theoretical phases of soil survey. The preparation of base maps and reports will be a feature of the course. Detailed as well as extended soil mapping will be studied. A good field knowledge of glacial geology is necessary for this work.

21. **Drainage and Irrigation.** Second term, credit three hours. Prerequisite course 1, Rural Engineering 3 and 20 or the equivalent, and Drawing 1 or its equivalent. Lectures, M W, 12. One discussion per week to be arranged. Caldwell Hall 143. Practice, Th, 2–5. Caldwell Hall 400 and field. Assistant Professor ROBB, Professor BIZZELL, and Assistant Professor MCCURDY.

A course given in cooperation with the Department of Rural Engineering, covering the principles and practice of drainage and irrigation. Two one-day excursions to drainage or irrigation projects at some distance from Ithaca will be held sometime in May. Laboratory fee, $2.

5. **Soils, Advanced Course.** Second term, credit two hours. Prerequisite course 1, and Chemistry 85 and 85a. Students must consult Professor BIZZELL before electing this course. Lectures, W F, 9. Caldwell Hall 143. Professor BIZZELL.

An advanced course designed particularly for students specializing in soil technology. The lectures will deal with the important properties of soils from

the theoretical and technical standpoints. The review of literature and preparation of papers will be an important part of the work.

8. **Mechanical Soil Analysis.** First term, credit one hour. Prerequisite course 1 and Chemistry 6. For graduate students only. Students must consult Professor BIZZELL before electing this course. One laboratory period a week, by appointment. Caldwell Hall 201. Professor BIZZELL.

A study of the methods of mechanical soil analysis. Intended for students specializing in soil technology. Laboratory fee, $3.

11. **Research.** Throughout the year. For graduate students only. Hours by appointment. Caldwell Hall 350. Professor BIZZELL.

Three graduate students may register for their major subjects with Professor LYON. Laboratory deposit, $15 a term.

14. **Seminary.** Throughout the year, no credit toward graduation. Open to seniors who have taken course 6, and required of graduate students. S, 11–12.30. Caldwell Hall 143. Professors LYON, FIPPIN, and BIZZELL, and Assistant Professors BUCKMAN and WILSON.

VEGETABLE GARDENING

Courses in vegetable gardening are so planned that students not specializing in the subject and those desiring a fuller knowledge are in separate classes.

Students who desire to take a considerable amount of work in this Department should consult with the staff early in their college course regarding the arrangement of their work. The following plan is strongly recommended:

	First Term (Oct., Nov., Dec., Jan.)	Second Term (Feb., Mar., Apr., May)	Third Term (June, July, Aug., Sept.)
First year	Required and elective courses	Required and elective courses Vegetable Gardening 1	Field experience
Second year	Required and elective courses	Field experience	
Third year	Required and elective courses	Required and elective courses Vegetable Gardening 3 (two-terms course) Vegetable Gardening 5	
Fourth year	Field experience	Elective courses Vegetable Gardening 4 Vegetable Gardening 7	Elective courses Vegetable Gardening 7 Vegetable Gardening 9

The courses are thus laid out according to the growing seasons rather than according to the academic year. The Department assists in finding suitable positions for students for their terms away from the College, although it assumes no responsibility in this direction.

Students specializing in vegetable gardening are expected to take the following courses:

Soils 1, 3 hours; Botany 20, 4 hours; Entomology 3, 3 hours; Farm Management 1 and 2, 2 and 4 hours; Floriculture 2, 3 hours; Plant Breeding 1 and 2 or 6, 3 and 1 or 4 hours; Plant Pathology 1 (Vegetable Gardening section), 4 hours.

Electives should be so chosen as to give a broad knowledge of agriculture as a whole.

1. **Vegetable Gardening, Introductory Course.** Second term, credit one hour. Open to freshmen. Lecture, F, 8. Poultry Building 375. Mr. WORK.

A course intended to give the student a broad view of vegetable gardening as a whole. The general relations and scope of the industry; its history and present importance; the types of vegetable gardening and their opportunities. Reports on assigned reading are required. Inspection trips to the college gardens and to commercial gardens at Elmira are required. The former is scheduled by appointment for afternoons, and the latter for a Saturday late in May. This course is prerequisite to courses 2 and 3, and enables the student to plan intelligently for his future work in vegetable gardening.

For students desiring a course for general training and for application in connection with other lines of agriculture

2. **Commercial Vegetable Gardening.** Second term, credit four hours. Prerequisite course 1 and Botany 1; must be preceded or accompanied by Soils 1. Lectures, T Th, 8. Poultry Building 375. Recitation, Th, 9. (If necessary one or two additional sections will be scheduled F, 9, S, 9.) Practice, T, 2–4.30. (If necessary an additional section will be arranged, Th, 2–4.30.) Poultry Building 350, vegetable greenhouses, and gardens. Messrs. WORK and KIRKPATRICK.

The principles of vegetable growing as applied in commercial production; choice of location; equipment; management; culture, special requirements, varieties, enemies, marketing, and profits. The laboratory work includes exercises in growing plants under glass, and in the planting and care of early outdoor vegetables. Each student assumes full charge of his own plantings, carrying them through to the end of the term. A one-day trip to visit market gardens is required near the end of the term. Cost about $5. Laboratory fee, $2.

For students specializing in or desiring a fuller knowledge of vegetable gardening

3. **Commercial Vegetable Gardening.** Second and third terms, credit four hours a term. Prerequisite course 1, Botany 1, and Soils 1. Lectures, M W, 8. Poultry Building 325. Practice including recitations: second term, M W, 2–4.30; third term, W, 2–4.30, Th, 10–1. Poultry Building 350, vegetable greenhouses, and gardens. Messrs. WORK and KENERSON.

A course covering essentially the same ground as course 2, but considering the problems more thoroughly. The time of this course corresponds with the growing season for the crops, and the student is in touch with plantings of the leading vegetables in the departmental gardens. This affords practice in the care, harvesting, and marketing of the products. Each student is assigned a small garden plot which he cares for throughout the two terms. Several short excursions are made to neighboring market gardens. Near the close of the spring term there will be a two-days trip to some of the most important vegetable-growing centers in the State, the cost of which will be about $10; exact date to be arranged. Laboratory fee, $3 a term.

4. **Vegetable Forcing.** Second term, credit three hours. Prerequisite course 2 or 3; should be preceded by Floriculture 2. Lectures, M W, 9. Poultry Building 325. Practice, S, 8–10.30. (If necessary, a second section will be arranged, M, 2–4.30.) Poultry Building 350 and vegetable greenhouses. Mr. SCHNECK.

Vegetable growing under glass; greenhouses for vegetables; management problems; the greenhouse crops, their requirements and culture. Laboratory work will consist chiefly of practical work in crop production. Each student will be assigned a plot in the greenhouse, on which he will grow vegetables to maturity, assuming full charge except as to heating and ventilation. The class will participate in a required one-day excursion to Rochester in April to visit greenhouses; cost, about $6. Laboratory fee, $2.

5. **Systematic Vegetable Crops.** Third term, credit three hours. Prerequisite course 3, or in special cases course 2, and permission to register. Lecture, T, 9. Poultry Building 325. Laboratory, Th F, 2–4.30. Vegetable gardens. Messrs. WORK and KENERSON.

Lectures and descriptive studies dealing with vegetable crops, their origin and botany; the varieties and types of the different vegetables, their characteristics, and their adaptation to different cultural and market conditions; judging and exhibition work. The important commercial types of all the vegetables are grown in the garden each year. Each student makes a special systematic study of a crop or a group of crops, and presents a report in typewritten form. Laboratory fee, $2.

6. **Practice.** First, second, or third term, one or two hours, without credit toward graduation. Prerequisite permission to register. By appointment. Messrs. WORK and SPIEGEL.

Opportunity is offered for a few students who are specializing in vegetable gardening to obtain practice in greenhouses and gardens.

7. **Vegetable Gardening, Advanced Course.** Problem and seminary. Problem, first, second, or third term; seminary, second term; credit two or more hours, by arrangement. Prerequisite course 3 and permission to register. Seminary, M, 4.35. Poultry Building 325. Mr. WORK and members of the staff.

A special problem, to be arranged; review and reports for seminary; occasional short excursions, and a two-days trip to some of the most important vegetable-growing centers in the State; cost, about $10; exact date (in May) to be arranged. A typewritten and bound report of the special problem is required. Laboratory fee, $1 per credit hour.

8. **Inspection Trip.** Third term, credit one hour. Prerequisite course 2 or 3 and permission to register. May not be elected unless satisfactory arrangements can be made with departments giving conflicting courses. Not given unless six register. Mr. WORK.

A trip occupying a week, to important vegetable-growing centers in the East. A wide variety of types of vegetable gardening will be observed on this trip, and markets will be visited. The cost will be about $50. A typewritten report is required.

9. **Canning Vegetable Crops.** Third term, credit two hours. (An additional credit hour of laboratory work may be elected by arrangement.) Prerequisite course 2 or 3. Lecture, T, 10. Poultry Building 350. Laboratory, ten forenoons by arrangement on W, F, or S, 8–1. East Ithaca gardens. Mr. KIRKPATRICK.

Canning as a means of utilizing surplus products of vegetable farms; lectures and laboratory work dealing with the principles and practices of preparing, packing, processing, and marketing preserved vegetable products. The Department operates a farm canning outfit with a daily capacity of 1000–1500 tins. A two-days trip will be arranged to some of the most important canning centers or to vegetable farms operating farm canning outfits. Exact date to be arranged; cost about $10–12. Laboratory fee, $3.50.

20. **Home Vegetable Gardening.** Second term, credit two hours. Lectures, T, 9. Poultry Building 325. Practice, F, 2–4.30. Poultry Building 350, vegetable greenhouses, and gardens. (If necessary, an additional section will be scheduled, S, 10.30–1.) Mr. SCHNECK.

Production of vegetables for home use; the planning and management of the garden, growing early plants, special requirements of crops, control of pests. The laboratory work consists chiefly of actual practice in the greenhouse, frame yard, and garden. Each student assumes full charge of his own plantings, and cares for them to the end of the term. Laboratory fee, $2.

CITIZENSHIP

A course in citizenship open to all students in the University is offered, under the direction of the Department of Political Science. Students in agriculture may elect this course in excess of the twenty hours of nonagricultural electives allowed during the four year course.

57b. **Lectures on Citizenship.** Second term, credit two hours. M W, 12, Goldwin Smith B.

A lecture each Monday by a non-resident lecturer and each Wednesday by a member of the Department. The course has been arranged by a committee of alumni who are actively engaged in civic and social work and who are cooperating in this way with the Department. It will follow the same general plan as last year, but the speakers and most of the subjects treated will be changed.

The course will be under the general charge of Professor ORTH. Readings, reports, and essays will be required.

EXTENSION WORK

The extension work of the College of Agriculture is designed to help persons directly on their farms, and to aid those who desire definite instruction but who cannot take a long or a regular course in agriculture at the University. The work supplements the teaching and experimenting of the College of Agriculture. It is professedly a popular work. It endeavors to reach the common problems of the people, to quicken the agricultural occupations, and to inspire a greater interest in country life. It is also a bureau of publicity, whereby there is an exchange of all important matters connected with the progress of the agriculture of the State.

WINTER COURSES

The Winter Courses now offered are seven in number, all opening on November 8, 1916, and closing on February 16, 1917. They are:

1. Agriculture
2. Dairy Industry
3. Poultry Husbandry
4. Fruit Growing
5. [Home Economics] Not given in 1916–17
6. Flower Growing
7. Vegetable Gardening

A special program describing these courses will be sent on application to Cornelius Betten, Secretary, New York State College of Agriculture, Ithaca, New York.

SUMMER COURSES

The primary object of the Summer School in Agriculture is to further agricultural education by aiding those engaged in it. The courses are arranged to meet the needs of the following classes:

1. Persons who desire to teach agriculture, nature study, and home economics or who desire to fit themselves for the supervision of such instruction.

2. Persons who desire to pursue investigations in agriculture. Some of the courses are advanced, and therefore suited for specialists who wish to follow their individual line of study.

3. College students in Cornell and other universities who wish to use part of the summer vacation for additional study.

4. Students entering the University who desire to obtain surplus credits at entrance and thereby to shorten their course.

In 1916 the Summer School will open on July 6 and close on August 16.

COURSES IN OTHER COLLEGES REQUIRED OF REGULAR STUDENTS IN THE COLLEGE OF AGRICULTURE

1. **English, Introductory Course.** Throughout the year, credit four hours a term. Students who have not taken the course in the first term may enter in the second term in sections provided for them. Open only to underclassmen who have satisfied the entrance requirement in English. Freshmen who are candidates for the degree of Bachelor of Arts will ordinarily take course 3, and may not enroll in course 1 except with the consent of the head of the Department. Assistant Professors ADAMS and MONROE: Drs. BAILEY and GILBERT; Messrs. BALDWIN, HEBEL, BOULTER, BUNDY, and LAPPIN. Twenty-eight sections at the following hours: T W Th F, 8, 10, 12, and M T Th F, 2. Rooms to be announced.

A study of representative works in English literature, including four plays of Shakespeare, two modern novels, selected essays, and poems of Milton and Tennyson. Practice in composition in connection with the reading, with incidental study of the principles of writing. Registration in the course is in charge of Dr. BAILEY.

Students who elect English 1 must apply at Goldwin Smith A on Monday, Tuesday, or Wednesday of registration week for assignment to sections.

1. **Introductory Inorganic Chemistry.** Lectures, recitations, and laboratory. Repeated in second term, credit six hours.

1a. Lectures, T Th, 11, Professor DENNIS and Mr. MCCOY: T Th, 12, Professor BROWNE and Mr. MCCOY.

1b. Recitations (one hour a week, to be arranged). Laboratory: First term, M F, 2–4.30; T Th, 2–4.30; W, 2–4.30, and S, 8–10.30. Second term, M F, 2–4.30; T Th, 2–4.30; W, 2–4.30, and S, 8–10.30, M W, 8–10.30. Professors DENNIS and BROWNE, Dr. WELSH, and Messrs. KIRK, POLLARD, TRESSLER, SHERWOOD, and MCKINNEY.

6. **Qualitative and Quantitative Analysis.** Repeated in second term, credit five hours. Prerequisite course 1. Dr. RHODES, and Messrs. STUPP, NELSON, CASE, GILCHRIST, and LOUDER. Lectures, T Th, 12. Laboratory sections: M W F, 2–5; T Th S, 8–11; T Th S, 9–12.

Qualitative work: the properties and reactions of the common elements and acids and their detection in various liquids and solid mixtures.

Quantitative work: the preparation and use of volumetric solutions and work in elementary gravimetric analysis.

1. **Elementary Geology.** Repeated in second term, credit three hours. Professor RIES, and Messrs. ———, ———, ELSTON, and ———. Lectures: first term, T Th, 11, Sibley Dome; second term, T Th, 9, Sibley Dome. Laboratory periods, M, T, W, Th, or F afternoon, or S morning. One all-day excursion required.

Planned to give beginners the fundamental principles of this branch of science, with special attention to dynamic and structural geology. Those desiring additional work in geology are advised to take one or more of the following courses: 2, 11, 21, 32.

2. **Introductory Experimental Physics.** Repeated in second term, credit five hours. Three lectures and two classroom periods a week. Lectures, T Th S, 9, or M W F, 11. Rockefeller A. Professors NICHOLS, MERRITT, and SHEARER, and Assistant Professor GIBBS. Classroom work: Assistant Professor GIBBS, and Messrs. BAILEY, BLACKBURN, BOWN, MALLORY, MORATH, MURDOCK, RODGERS, SWISHER, and WEEKS. Hours to be arranged. Required of candidates for B.Chem., C.E., B.S., and D.V.M.

Entrance physics is not accepted as an equivalent of this course.

1. **General Zoology.** First term, credit five hours. Lectures, M W F, 10, McGraw Hall 5. Laboratory: section 1, M, 2–4.30, S, 8–10.30; section 2, T Th, 8–10.30; section 3, T Th, 2–4.30; section 4, W F, 2–4.30. McGraw Hall 2a. Assistant Professor REED, Mr. SHADLE, and assistants.

A general survey of the animal phyla, the life processes, adaptations, reactions to environmental stimuli, the relationships of animals, the principles of zoology, and an introduction to morphology and development. As far as possible each phase of the subject is illustrated by living material.

Registration with the Department before instruction begins is necessary for the assignment of laboratory and lecture sections. Laboratory fee, $5.

10. **Veterinary Physiology.** The physiology of the nutrition and secretion of the domesticated animals. First term, credit three hours. Lectures, M W F, 10. Veterinary College. Professor FISH.

3. **Elementary Human Physiology.** Repeated in second term, credit three hours. First term, M W F, 10, Professor SIMPSON and assistants. Second term: section a, M W F, 10, Professor SIMPSON and assistants; section b, M W F, 12, Assistant Professor DRESBACH and assistants. In registering for this course in the second term students are required to specify the section they desire to attend.

An introductory course for students of the biological sciences; also for students who expect to teach physiology in the secondary schools. A general review of the functions of the systems and organs of the human body, with introductory remarks on structures. The lectures will be fully illustrated by experiments, lantern slides, and diagrams.

51. **Elementary Economics.** Throughout the year, credit three hours a term. One lecture and two recitations each week. Lectures, M, 9; repeated M, 11. Barnes Auditorium. Professor DAVENPORT. Recitations, T Th, 8, 9, 10, 11, 12; W F, 8, 9, 10, 11, 12. Assistant Professors USHER and REED, Drs. WOODBURY and KNIGHT, and Messrs. HUGINS and KOCHENDERFER. Section assignments made at the first lecture.

An introduction to economics including a survey of business organization and corporation finance; principles of value, money, banking, and prices; international trade; free trade and protection; wages and labor conditions; the control of railroads and trusts; socialism; principles and problems of taxation.

1. **Solid Geometry.** Repeated in second term, credit three hours. First term, T Th S, 10; second term, M W F, 10.

Open to all students, but especially designed for those who have entered with the minor requirements in mathematics and are preparing: (a) to teach mathematics in the secondary schools; (b) to take up engineering work later in the course; (c) to specialize in chemistry, physics, or forestry.

3. **Plane Trigonometry.** Repeated in second term, credit three hours. First term, M W F, 10; second term, T Th S, 10.

Open to all students, but designed especially for those mentioned under course 1.

1. **Practical and Theoretical Military Training.** Throughout the year. Required of freshmen and sophomores. Lieutenant THOMPSON and assistants. M W F, 4.45. Armory.

The training is primarily that of infantry troops, organized into companies and a band, but those who have completed the first year's work satisfactorily may elect assignment to engineer company, signal corps company, machine gun platoon, or sanitary troops.

Practical instruction outdoors in fair weather three hours a week, and also practice on outdoor target range. Indoors during inclement weather two hours a week, and also practice on indoor target range. Theoretical instruction in inclement weather one hour a week covering the following: aims, purposes, and necessity of our army; general requirements governing our military organization, both as to troops with colors and with reserves; military history of the United States; our present policy and organization; and other subjects pertaining to the duties of troops in camp and in campaign.

The band is trained by Mr. Brissette, all instruments, music, and the like, being furnished free of cost. The members constitute the University Band. Applicants are required to have made a satisfactory beginning with some one of the customary band instruments.

4. **Physical Training for Women (Freshmen).** Throughout the year, three periods a week. Misses CANFIELD and WICHELNS.

5. **Physical Training for Women (Sophomores).** Throughout the year, three periods a week. Misses CANFIELD and WICHELNS.

OFFICIAL PUBLICATIONS OF CORNELL UNIVERSITY

Issued at Ithaca, New York, monthly from July to November inclusive, and semi-monthly from December to June inclusive.

[Entered as second-class matter, August 31, 1910, at the post office at Ithaca, New York, under the Act of July 16, 1894.]

These publications include:

The Annual Register (for the year 1915–16, published January 1, 1916), price 50 cents.
Book of Views, price 25 cents.
Directory of Faculty and Students, Second Term, 1915–16, price 10 cents, and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each publication is given after the title.
General Circular of Information for Prospective Students, December 15, 1915.
Announcement of the College of Arts and Sciences, April 15, 1916.
Announcement of Sibley College of Mechanical Engineering, and the Mechanic Arts, January 15, 1916.
Announcement of the College of Civil Engineering, March 15, 1916.
Announcement of the College of Law, May 15, 1916.
Announcement of the College of Architecture, August 1, 1915.
Announcement of the New York State College of Agriculture, June 1, 1916.
Announcement of the Winter Courses in the College of Agriculture, September 1, 1915.
Announcement of the Summer Term in Agriculture, April 1, 1916.
Announcement of the New York State Veterinary College, May 1, 1916.
Announcement of the Graduate School, February 1, 1916.
Announcement of the Summer Session, March 1, 1916.
Annual Report of the President, November 1, 1915.
Pamphlets on prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, New York.

Correspondence concerning the publications of the University should be addressed to

The Secretary of Cornell University,
Ithaca, New York.